University of Kentucky®

Procurement Services

Request for Proposal
UK-2590.2-2-25
Proposal Due Date – 10/08/2024

Whitehall Classroom Building
Equipment Package #1
Secondary Unit Substation
Air Handler

University of Kentucky
Procurement Services

REQUEST FOR PROPOSAL (RFP)

ATTENTION: This is not an order. Read all instructions, terms and conditions carefully.

PROPOSAL NO.:	**UK-2590.2-2-25**	**RETURN ORIGINAL COPY OF PROPOSAL TO:**
Issue Date:	**09/06/2024**	**UNIVERSITY OF KENTUCKY**
Title:	**Whitehall Classroom Building Equipment Package #1 Secondary Unit Substation - Air Handler**	**PROCUREMENT SERVICES**
Purchasing Officer:	**Corey W. Leslie**	**411 S LIMESTONE**
Phone:	**859-323-5405**	**ROOM 322 PETERSON SERVICE BLDG.**
Email:	**cckbidquestions@uky.edu**	**LEXINGTON, KY 40506-0005**

IMPORTANT: PROPOSALS MUST BE RECEIVED BY: 10/08/2024 3 P.M. LEXINGTON, KY TIME.

NOTICE OF REQUIREMENTS

1. The University's General Terms and Conditions and Instructions to Bidders, viewable at https://purchasing.uky.edu/bid-and-proposal-opportunities, apply to this RFP. When the RFP includes construction services, the University's General Conditions and Special Conditions for Construction and Instructions to Bidders, viewable at https://purchasing.uky.edu/bid-and-proposal-opportunities, apply to the RFP.
2. Contracts resulting from this RFP must be governed by and in accordance with the laws of the Commonwealth of Kentucky.
3. Any agreement or collusion among offerors or prospective offerors, which restrains, tends to restrain, or is reasonably calculated to restrain competition by agreement to bid at a fixed price or to refrain from offering, or otherwise, is prohibited.
4. Any person who violates any provisions of KRS 45A.325 shall be guilty of a felony and shall be punished by a fine of not less than five thousand dollars nor more than ten thousand dollars or be imprisoned not less than one year nor more than five years, or both such fine and imprisonment. Any firm, corporation, or association who violates any of the provisions of KRS 45A.325 shall, upon conviction, be fined not less than ten thousand dollars or more than twenty thousand dollars.

AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing as provided by KRS 523.040:

1. That I am the offeror (if the offeror is an individual), a partner, (if the offeror is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the offeror is a corporation);
2. That the attached proposal has been arrived at by the offeror independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other Contractor of materials, supplies, equipment or services described in the RFP, designed to limit independent bidding or competition;
3. That the contents of the proposal have not been communicated by the offeror or its employees or agents to any person not an employee or agent of the offeror or its surety on any bond furnished with the proposal and will not be communicated to any such person prior to the official closing of the RFP:
4. That the offeror is legally entitled to enter into contracts with the University of Kentucky and is not in violation of any prohibited conflict of interest, including, but not limited to, those prohibited by the provisions of KRS 45A.330 to .340, and164.390;
5. That the offeror, and its affiliates, are duly registered with the Kentucky Department of Revenue to collect and remit the sale and use tax imposed by Chapter 139 to the extent required by Kentucky law and will remain registered for the duration of any contract award;
6. That I have fully informed myself regarding the accuracy of the statement made above.

SWORN STATEMENT OF COMPLIANCE WITH CAMPAIGN FINANCE LAWS

In accordance with KRS45A.110 (2), the undersigned hereby swears under penalty of perjury that he/she has not knowingly violated any provision of the campaign finance laws of the Commonwealth of Kentucky and that the award of a contract to a bidder will not violate any provision of the campaign finance laws of the Commonwealth of Kentucky.

CONTRACTOR REPORT OF PRIOR VIOLATIONS OF KRS CHAPTERS 136, 139, 141, 337, 338, 341 & 342

The contractor by signing and submitting a proposal agrees as required by 45A.485 to submit final determinations of any violations of the provisions of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 that have occurred in the previous five (5) years prior to the award of a contract and agrees to remain in continuous compliance with the provisions of the statutes during the duration of any contract that may be established. Final determinations of violations of these statutes must be provided to the University by the successful contractor prior to the award of a contract.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The contractor, by submitting a proposal, certifies that he/she is in compliance with the Code of Federal Regulations, No. 41 CFR 60-1.8(b) that prohibits the maintaining of segregated facilities.

SIGNATURE REQUIRED: This proposal cannot be considered valid unless signed and dated by an authorized agent of the offeror. Type or print the signatory's name, title, address, phone number and fax number in the spaces provided. Offers signed by an agent are to be accompanied by evidence of his/her authority unless such evidence has been previously furnished to the issuing office

DELIVERY TIME:	**NAME OF COMPANY:**	**KY Secretary of State ID #**
PROPOSAL FIRM THROUGH:	**ADDRESS:**	**Phone/Fax:**
PAYMENT TERMS:	**CITY, STATE & ZIP CODE:**	**E-MAIL:**
SHIPPING TERMS: F. O.B. DESTINATION PREPAID AND ALLOWED	**TYPED OR PRINTED NAME:**	**WEB ADDRESS:**
FEDERAL EMPLOYER ID NO.:	**SIGNATURE:**	**DATE:**

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1.0 DEFINITIONS

The term "addenda" means written or graphic instructions issued by the University of Kentucky prior to the receipt of proposals that modify or interpret the RFP documents by additions, deletions, clarifications and/or corrections.

The term "competitive negotiations" means the method authorized in the Kentucky Revised Statutes, Chapter 45A.085.

The terms "offer" or “proposal” mean the offeror’s/offerors’ response to this RFP.

The term "offeror" means the entity or contractor group submitting the proposal.

The term "contractor" means the entity receiving a contract award.

The term "purchasing agency" means the University of Kentucky, Procurement Services, Room 322 Peterson Service Building, Lexington, KY 40506-0005.

The term "purchasing official" means the University of Kentucky’s appointed contracting representative.

The term "responsible offeror" means a person, company or corporation that has the capability in all respects to perform fully the contract requirements and the integrity and reliability that will assure good faith performance. In determining whether an offeror is responsible, the University may evaluate various factors including (but not limited to): financial resources; experience; organization; technical qualifications; available resources; record of performance; integrity; judgment; ability to perform successfully under the terms and conditions of the contract; adversarial relationship between the offeror and the University that is so serious and compelling that it may negatively impact the work performed under this RFP; or any other cause determined to be so serious and compelling as to affect the responsibility of the offeror.

The term "solicitation" means RFP.

The term "University" means University of Kentucky.

2.0 GENERAL OVERVIEW

2.1 Intent and Scope

This Request for Proposal (RFP) is issued to solicit proposals from qualified, experienced, financially sound, and responsible firms to provide a single-ended electrical unit substation for installation into the Whitehall Classroom building, and to provide 4 Air Handling Units and 4 Return Fan Units to replace the demolished Air Handler system in the main White Hall Classroom basement mechanical rooms.

The Scope of Services includes the design of the cooling tower to meet the performance listed in Section 7.0, Scope of Services and shall fit in the designated space. Potential Suppliers are responsible to field measure the site to assure fit. All materials shall be made of material that will not decay or rust. Any material exposed to the sun shall be UV inhibited.

It is the intent of the University to award a contract to the qualified Offeror whose Offer, conforming to the conditions and requirements of the RFP, is determined to be the most advantageous to the University, cost and other factors considered.

The firm whose systems is selected would provide all design and installation assistance services necessary to construct the facilities in accordance with the guidelines, standards and limitations contained in the Request for Proposal and in the Offerors Proposal.

The University intends to issue a separate order to an installation contractor.

The Scope of Services is further defined in Section 7.0 of this Request for Proposal (RFP).

In addition, please refer to the attached drawings:

2.2 Background Information

The University of Kentucky is renovating the majority of the White Hall Classroom Building. The entire air handling unit and majority of the air side equipment throughout the building is being replaced. In addition, part of the chilled water piping (feeding the new air handler) will be replaced and all of the hydronic heating piping (from the mechanical room to each VAV) will be replaced throughout.

2.3 University Information

Upon his arrival in 2011, President Eli Capilouto set an ambitious agenda to extend and enhance our role as Kentucky’s land-grant and flagship research university. By focusing on infrastructure growth and improvement; creating opportunities for innovative teaching, learning and academic excellence; fostering a robust research enterprise; providing life-saving subspecialty care; empowering communities through service and outreach; and encouraging a transparent and shared dialogue about institutional priorities; the University of Kentucky will help ensure a Kentucky tomorrow that is healthier, wealthier and wiser than it is today.

Our mission is to advance Kentucky.

Founded in 1865 as a land-grant institution adjacent to downtown Lexington, UK is nestled in the scenic heart of the beautiful Bluegrass region of Kentucky. From its early beginnings, with only 190 students and 10 professors, UK's campus now covers more than 900 acres. The university enrolled more than 32,000 students in Fall 2022 and has approximately 25,000 employees, including nearly 3,000 full-time faculty.

UK is one of a small number of universities in the United States that has programs in agriculture, engineering, law, fine arts and a full complement of health colleges including medicine and pharmacy, on a single campus alongside an academic health system, leading to groundbreaking discoveries and unique interdisciplinary collaboration.

The state's flagship university consists of 18 academic and professional colleges where students can choose from more than 200 majors and degree programs at the undergraduate and graduate levels. The colleges are Agriculture, Food and Environment; Arts and Sciences; Business and Economics; Communication and Information; Dentistry; Design; Education; Engineering; Fine Arts; Graduate School; Health Sciences; Honors; Law; Medicine; Nursing; Pharmacy; Public Health; and Social Work. These colleges are supported by a modern research library system.

Research at the University of Kentucky is a dynamic enterprise encompassing both traditional scholarship and emerging technologies. UK's research faculty, staff and students are establishing UK as one of the nation's most prolific public research universities. UK researchers were awarded more than $452.9 million in extramural grant and contract funding in fiscal year 2022. Fifty-six percent of this funding comes from agencies in the federal government ($256 million) such as the National Institutes of Health, National Science Foundation, Department of Energy, Department of Defense and numerous other federal, state and industry sponsors. Expenditures from research and development (R&D) activities at the university generate more than $772 million in economic development across the Commonwealth of Kentucky and support more than 4,395 jobs.

With more than 70 research centers and institutes, UK researchers are discovering new knowledge, providing a rich training ground for current students and the next generation of researchers and advancing the economic growth of the Commonwealth of Kentucky. Several centers excel in the services offered to the public. The Gluck Equine Research Center is one of only three facilities of its kind in the world, conducting equine disease research.

The Center for Applied Energy Research (CAER) is internationally recognized for research in algae for carbon dioxide clean up, carbon materials, concrete and cement, emissions control in utilities, energy policy, fuels research, hydrogen, materials characterization and plant optimization.

Among the brightest examples of UK's investment in transformative research is the Markey Cancer Center. As a center of excellence and distinction at UK, Markey's robust research and clinical enterprise is the cornerstone of our commitment to Kentucky – fundamental to our success in uplifting lives through our endeavors and improving the general health and welfare of our state – burdened by the nation's highest rate of cancer deaths per 100,000 people. In 2013, Markey earned the prestigious National Cancer Institute-designation (NCI) – one of 68 nationally and the only one in Kentucky. The designation was renewed in 2018.

Both CAER and Markey are cornerstones of seven Research Priority Areas (RPAs) at the University of Kentucky. These areas — chosen based on local relevance, existing funding strength, sustainability and disciplinary scholarly diversity — focus UK's top research talent on the most pressing challenges confronting our state.

The University of Kentucky is the recipient of a Clinical Translational Sciences Award (CTSA) from the National Institutes of Health (NIH). As one of only 60 institutions with this research distinction, UK was awarded the CTSA for its potential in moving research and discovery in the lab into practical field and community applications. The CTSA and NCI are part of a trifecta of federal research grants that includes an Alzheimer's Disease Center. UK is one of only 29 universities in the country to hold all three premier grants from NIH.

Established in 1957, the medical center at UK is one of the nation's finest academic medical centers and includes the university's clinical enterprise, UK HealthCare. Licensed for 965 beds across UK Albert B. Chandler Hospital, Kentucky Children's Hospital and UK Good Samaritan Hospital, the system is supported by a growing faculty and staff providing the most advanced subspecialty care for the most critically injured and ill patients throughout the Commonwealth and beyond. Since 2014, the number of patients served by the medical enterprise has nearly doubled, with more than 38,000 discharges in 2022.

UK Chandler Hospital includes the only Level 1 Trauma Center for both adult and pediatric patients in Central and Eastern Kentucky. In addition, UK HealthCare recently opened one of the country's largest robotic hybrid operating rooms and the first of its kind in the region. While the new patient care pavilion is the leading health care facility for advanced medical procedures in the region, our talented physicians consult with and travel to our network of affiliate hospitals so Kentuckians can receive the best health care available close to their home and never need to leave the Bluegrass for complex subspecialty care.

As of December 1, 2022, King's Daughters Medical Center, based in Ashland, Kentucky, officially became part of the University of Kentucky. King's Daughters Medical Center serves a 16-county region across Kentucky, Ohio and West Virginia. Its health system is composed of two acute-care hospitals totaling 465 licensed beds, more than 50 ambulatory centers and practice locations, a long-term care facility, medical transport company and six urgent care centers.

The University of Kentucky Board of Trustees on Friday April 26, 2024 approved plans to proceed with the acquisition of St. Claire HealthCare in Morehead. The move for St. Claire to become part of UK will expand clinical and academic programs as well as result in greater access to high-quality patient care for more Kentuckians. St. Claire can continue its 60-year tradition of serving Northeastern Kentucky for decades to come, operating under the name UK St. Claire. St. Claire HealthCare is one of the largest employers in the region, with over 1,200 staff members, including a growing medical staff of more than 125 physicians and nearly 70 advanced practice professionals representing more than 30 medical specialties. It includes the largest rural hospital in Northeastern Kentucky, seven primary care locations located within five counties, a multi-specialty medical pavilion, two urgent care centers, a pediatrics clinic, as well as a retail pharmacy, counseling center, medical equipment and supply store, and an outpatient center. Additionally, St. Claire HealthCare provides home health and hospice services in eight counties within its 11-county service region. The acquisition was finalized on July 1, 2024.

UK's agenda remains committed to accelerating the university's academic excellence in all areas and gaining worldwide recognition for its outstanding academic programs, its commitment to students, its investment in pioneering research and discovery, its success in building a diverse community and its engagement with the larger society. This commitment is all part of the university's mission as a 21st century flagship and land-grant research university. From its Nobel Laureates to cutting-edge work in addressing health disparities, and from the artistic wonders that

stir souls to our scientific creativity that inspires minds, UK seeks a brighter future through the contributions of our faculty, staff, students and alumni.

We are the University of Kentucky. We are committed to advancing Kentucky in everything that we do.

SUSTAINABILITY

Sustainability is an institution-wide priority for the University of Kentucky. We strive to ensure that all activities are ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. This commitment also prioritizes the integration of these principles in curricula, research, athletics, health care, creative works, and outreach. This principled approach to operational practices and intellectual pursuits is intended to prepare students and empower the campus community to support sustainable development in the Commonwealth and beyond. The UK Sustainability Strategic Plan guides these efforts (https://www.uky.edu/sustainability/sustainability-strategic-plan).

2.4 Economic Engagement and Procurement

The University of Kentucky is committed to serving as an advocate for Kentucky located businesses as part of its on-going workforce development and economic development efforts.

The University desires to increase the amount of goods and services acquired from Kentucky located businesses. The University encourages its suppliers to support and assist in this effort.

The University's goals for increasing participation in procurement projects include but are not limited to the following:

- To ensure the absence of barriers that reduce participation.
- Educate vendors on "how to do business" with the University.
- Support Kentucky located vendors seeking to do business with the University in the areas of goods, services, construction, and other areas of procurement.
- Encourage participation of qualified Kentucky located vendors by directing them to agencies that can benefit from their product or service.
- Provide resources for Kentucky located vendors.
- Sponsor events to assist Kentucky located vendors in becoming active, responsible, and responsive participants in the University's purchasing opportunities.

For additional information regarding how Kentucky located suppliers may participate in this Request for Proposal, submit any questions to the Procurement Officer as indicated in Section 3.2 by the Deadline for Written Questions date.

3.0 PROPOSAL REQUIREMENTS

3.1 Key Event Dates

Release of RFP	09/06/2024
Pre-Proposal Conference (Optional)	09/10/2024 @ 10:00am EST
Deadline for Written Questions	09/16/2024 @ 1:00pm EST
RFP Proposals Due	10/08/2024 @ 3:00pm EST

3.2 Offeror Communication

All communications with the University regarding this RFP shall only be directed to the procurement officer listed above.

All addenda and updates will be communicated through the Lynn Imaging Planroom.

Plans, Specifications, and official solicitation documents are available from:

Lynn Imaging
328 Old Vine Street
Lexington Kentucky 40507
Phone (859) 255-1021
Fax (859) 233-1558

In addition, Lynn Imaging and the University have a web site at: www.ukplanroom.com where plans can be ordered.

Interested vendors must identify the status of their firm as a prime contractor, miscellaneous subcontractor, material supplier or other when ordering Plans and Specifications.

3.3 Pre-Proposal Conference

A pre-proposal conference will be held via Zoom on 9/10/2024 at 10:00am EST to allow prospective contractors an opportunity to ask questions and clarify the University's expectations. This conference provides offerors an opportunity for oral questions.

Meeting URL: https://uky.zoom.us/j/84137711042?pwd=v7dr06vWLXxqo5ejQ15lnm2F9IEASa.1

Meeting ID: 841 3771 1042
Passcode: 189426
Dial: +1 309 205 3325
The following items should be noted in reference to the pre-proposal conference:

- Attendance at the pre-proposal conference is optional**.** At this conference, the scope of services will be discussed in detail.

- Offerors are encouraged to submit written questions after the conference by the date listed in Section 3.1.

The University will prepare written responses to all questions submitted and make them available to all offerors. The questions and answers will be made part of the RFP and may become part of the contract with the successful contractor. Answers given orally at the conference are not binding.

3.4 Offeror Presentations

All offerors whose proposals are judged acceptable for award may be required to make a presentation to the evaluation committee.

3.5 Preparation of Offers

The offeror is expected to follow all specifications, terms, conditions and instructions in this RFP.

The offeror will furnish all information required by this solicitation.

Proposals should be prepared simply and economically, providing a description of the offeror's capabilities to satisfy the requirements of the solicitation. Emphasis should be on completeness and clarity of content. All documentation submitted with the proposal should be bound in the single volume except as otherwise specified.

An electronic version of the RFP, in .PDF format only, is available through the University of Kentucky Procurement Services website at: https://purchasing.uky.edu/bid-and-proposal-opportunities.

3.6 Proposed Deviations from the RFP

The stated requirements appearing elsewhere in this RFP shall become a part of the terms and conditions of any resulting contract. Any deviations therefrom should be specifically defined in accordance with the transmittal letter, Section 4.3 (d). If accepted by the University, the deviations shall become part of the contract, but such deviations must not be in conflict with the basic nature of this RFP.

Note: Offerors should not submit their standard terms and conditions as exceptions to the University's General Terms and Conditions. Each exception to the University's General Terms and Conditions should be individually addressed.

3.7 Proposal Submission and Deadline

Offeror must provide the following materials prior to 3 p.m. (Lexington, KY time) on the date specified in Section 3.1 and addressed to the purchasing officer listed in Section 3.2:

- **Technical Proposal:** One (1) proposal on an electronic storage device (USB) clearly marked with the proposal number and name, firm name and what is included (Technical Proposal) and one (1) printed original.

- **Financial Proposal:** One (1) proposal on an electronic storage device (USB) clearly marked with the proposal number and name, firm name and what is included (Financial Proposal) and one (1) printed original.

Note: Proposals received after the closing date and time will not be considered. In addition, proposals received via fax or e-mail are not acceptable.

The University of Kentucky accepts deliveries of RFPs Monday through Friday from 8 a.m. to 5 p.m. Lexington, KY time. However, RFPs must be received by 3 p.m. Lexington, KY time on the date specified on the RFP in order to be considered.

Proposals should be enclosed in sealed envelopes to the above referenced address and should show on the face of the envelope: the closing time and date specified, the solicitation number and the name and address of the offeror. The technical proposal should be submitted in a sealed envelope and the financial proposal should be submitted in a sealed envelope under separate cover. Both sealed envelopes should have identical information on the cover, with the addition that one will state “Technical Information,” and the other, “Financial Proposal.”

Note: In accordance with the Kentucky Revised Statute 45A.085, there will be no public opening.

3.8 Modification or Withdrawal of Offer

An offer and/or modification of an offer received at the office designated in the solicitation after the exact hour and date specified for receipt will not be considered.

An offer may be modified or withdrawn by written notice before the exact hour and date specified for receipt of offers. An offer also may be withdrawn in person by an offeror or an authorized representative, provided the identity of the person is made known and the person signs a receipt for the offer, but only if the withdrawal is made prior to the exact hour and date set for receipt of offers.

3.9 Acceptance or Rejection and Award of Proposal

The University reserves the right to accept or reject any or all proposals (or parts of proposals), to waive any informalities or technicalities, to clarify any ambiguities in proposals and (unless otherwise specified) to accept any item in the proposal. In case of error in extension or prices or other errors in calculation, the unit price shall govern. Further, the University reserves the right to make a single award, split awards, multiple awards or no award, whichever is in the best interest of the University.

3.10 Rejection

Grounds for the rejection of proposals include (but not be limited to):

- Failure of a proposal to conform to the essential requirements of the RFP.

- Imposition of conditions that would significantly modify the terms and conditions of the solicitation or limit the offeror's liability to the University on the contract awarded on the basis of such solicitation.

- Failure of the offeror to sign the University RFP. This includes the Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest statements.

- Receipt of proposal after the closing date and time specified in the RFP.

3.11 Addenda

Any addenda or instructions issued by the purchasing agency prior to the time for receiving proposals shall become a part of this RFP. Such addenda should be acknowledged in the proposal. No instructions or changes shall be binding unless documented by a proper and duly issued addendum.

3.12 Disclosure of Offeror's Response

The RFP specifies the format, required information and general content of proposals submitted in response to this RFP. The purchasing agency will not disclose any portions of the proposals prior to contract award to anyone outside Procurement Services, the University's administrative staff, representatives of the state or federal government (if required) and the members of the committee evaluating the proposals. After a contract is awarded in whole or in part, the University shall have the right to duplicate, use or disclose all proposal data submitted by offerors in response to this RFP as a matter of public record.

Any submitted proposal shall remain valid six (6) months after the proposal due date.

The University shall have the right to use all system ideas, or adaptations of those ideas, contained in any proposal received in response to this RFP. Selection or rejection of the proposal will not affect this right.

3.13 Restrictions on Communications with University Staff

From the issue date of this RFP until a contractor is selected and a contract award is made, offerors are not allowed to communicate about the subject of the RFP with any University administrator, faculty, staff or members of the board of trustees except: the purchasing office representative, any University purchasing official representing the University administration, others authorized in writing by the purchasing office and University representatives during offeror presentations. If violation of this provision occurs, the University reserves the right to reject the offeror's proposal.

3.14 Cost of Preparing Proposal

Costs for developing the proposals and any subsequent activities prior to contract award are solely the responsibility of the offerors. The University will provide no reimbursement for such costs.

3.15 Disposition of Proposals

All proposals become the property of the University. The successful proposal will be incorporated into the resulting contract by reference.

3.16 Alternate Proposals

Offerors may submit alternate proposals. If more than one proposal is submitted, all should be complete (separate) and comply with the instructions set forth within this document. Each proposal will be evaluated on its own merits.

3.17 Questions

All questions should be submitted by e-mail to the purchasing officer listed in Section 3.2 no later than the date listed in Section 3.1.

3.18 Section Titles in the RFP

Section titles used herein are for the purpose of facilitating ease of reference only and shall not be construed to infer the construction of contractual language.

3.19 No Contingent Fees

No person or selling agency shall be employed or retained or given anything of monetary value to solicit or secure this contract, except bona fide employees of the offeror or bona fide established commercial or selling agencies maintained by the offeror for the purpose of securing business. For breach or violation of this provision, the University shall have the right to reject the proposal, annul the contract without liability, or, at its discretion, deduct from the contract price or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee or other benefit.

3.20 Proposal Addenda and Rules for Withdrawal

Prior to the date specified for receipt of offers, a submitted proposal may be withdrawn by submitting a written request for its withdrawal to the University purchasing office, signed by the offeror. Unless requested by the University, the University will not accept revisions or alterations to proposals after the proposal due date.

3.21 Requirement to Perform Vendor Onboarding and Registration

As a condition of award, and for any renewals performed during the life of the contract, successful Contractor agrees to register their company with PaymentWorks, Inc., the University's vendor onboarding application. Registration information will be provided by Procurement Services as part of the award process. Further, should any company or business information change during the life of the contract, successful Contractor agrees to update this information in PaymentWorks as applicable. Supplier agrees to and should be responsible for all updates on their PaymentWorks account as it relates to submitting new remit-to addresses or other required supplier profile information. PaymentWorks provides support to all suppliers transacting with the University of Kentucky on the platform. Supplier agrees to and should be responsible for engaging PaymentWorks Support for any needed issues regarding updates or other matters to ensure their supplier account remains connected to the University.

4.0 PROPOSAL FORMAT AND CONTENT

4.1 Proposal Information and Criteria

The following list specifies the items to be addressed in the proposal. Offerors should read it carefully and address it completely and in the order listed to facilitate the University's review of the proposal.

Proposals shall be organized into the sections identified below. The content of each section is detailed in the following pages. It is strongly suggested that offerors use the same numbers for the following content that are used in the RFP.

- Signed Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest Form
- Transmittal Letter
- Executive Summary and Proposal Overview
- Criteria 1 - Offeror Qualifications
- Criteria 2 – Quality of Construction
- Criteria 3 – Physical Size
- Criteria 4 – Ease of Maintenance
- Criteria 5 – Financial Offer
- Criteria 6 – Schedule
- Criteria 7 – Other Additional Information

4.2 Signed Authentication of Proposal and Statements of Non-Collusion and Non-Conflict of Interest Form

The Offeror will sign and return the proposal cover sheet and print or type their name, firm, address, telephone number and date. The person signing the offer should initial erasures or other changes. An offer signed by an agent is to be accompanied by evidence of their authority unless such evidence has been previously furnished to the purchasing agency. The signer shall further certify that the proposal is made without collusion with any other person, persons, company or parties submitting a proposal; that it is in all respects fair and in good faith without collusion or fraud; and that the signer is authorized to bind the principal offeror.

4.3 Transmittal Letter

The Transmittal Letter accompanying the RFP should be in the form of a standard business letter and should be signed by an individual authorized to legally bind the offeror. It should include:

- A statement referencing all addenda and written questions, the answers and any clarifications to this RFP issued by the University and received by the offeror (If no addenda have been received, a statement to that effect should be included.).

- A statement that the offeror's proposal shall remain valid for six (6) months after the closing date of the receipt of the proposals.

- A statement that the offeror will accept financial responsibility for all travel expenses incurred for oral presentations (if required) and candidate interviews.
- A statement that summarizes any deviations or exceptions to the RFP requirements and includes a detailed justification for the deviation or exception.

- A statement that identifies the confidential information as described in Section 6.23.

4.4 Executive Summary and Proposal Overview

The Executive Summary and Proposal Overview should condense and highlight the contents of the technical proposal in such a way as to provide the evaluation committee with a broad understanding of the entire proposal.

As part of the Executive Summary and Proposal Overview, Offeror should submit with their response a summarized profile describing the demographic nature of their company or organization:

1. When was your organization established and/or incorporated?

2. Indicate whether your organization is classified as local, regional, national, or international.

3. Describe the size of your company in terms of number of employees, gross sales, etc.

4. Is your company certified as small business, minority-owned, women-owned, veteran-owned, disabled-owned, or similar classification?

5. Include other demographic information that you feel may be applicable to the Invitation for Bids submission.

Business Description	**Check All That Apply**
Minority-Owned	
Woman-Owned	
Small Business	
Veteran-Owned	
LGBTQ-Owned	
Disability-Owned Business Entity (DOBE)	
Diversity Not Indicated	

Race/Ethnicity	**Check One**
Asian	
Black/African American	
Hispanic or Latino	
Native American	
Native Hawaiian/Pacific Islander	
White	

Other	
Prefer Not to Say	

Kentucky Located	**Yes/No?**
Kentucky Located – Please indicate whether your business entity is physically located within the Commonwealth of Kentucky.	

4.5 Criteria 1 - Offeror Qualifications

The purpose of the Offeror Qualifications section is to determine the ability of the Offeror to respond to this Request for Proposal. Offerors must describe and offer evidence of their ability to meet each of the qualifications listed below.

a) Please provide the contact information and a brief narrative describing the history of your company. Identify the ownership of your company, the primary contact person for the University account, and provide a statement to indicate if your company has ever filed for bankruptcy, been in default on a loan, or if there are pending liens, claims, or lawsuits against the company. If so, please provide a complete description of the circumstances and status.

b) Please provide the Offerors qualifications for performing the work described in this RFP.

c) Do you have the personnel to support the work required for the services described in this RFP? How many employees are in your company?

d) How long the company has been making products like the one offered.

4.6 Criteria 2 – Quality of Construction

a) Material used for construction.

b) Review of assembly and fastening technics.

c) Quality of motors and other mechanical equipment.

d) Describe assembly and shipping techniques.

e) Please review the technical specifications and your proposal to ensure coverage. Indicate if there are any missing elements that need to be addressed.

4.7 Criteria 3 – Physical Size

a) AHU: The air handling and return fan units needs to be “knock down” construction and brought in through the louvers or existing mechanical room doors and worked around the existing structures.

b) AHU: How will the unit fit in the space, weight of the unit, piping connection, air intakes, access and service platform locations.

c) Both: Provide a REVIT family of the equipment proposed along with the submittal.

4.8 Criteria 4 – Ease of Maintenance

a) Provide information describing routine maintenance procedures and cost, long term maintenance issues, accessibility, longevity of materials, elements of design that increase maintainability.

4.9 Criteria 5 – Financial Offer

The Financial Summary Form shall contain the complete financial offer made to the University using the format contained in Section 8.0. **All financial information must be submitted in a sealed envelope under separate cover.**

4.10 Criteria 6 – Schedule

Provide a schedule showing:

1. Shop drawings.
2. Fabrication.
3. Shipping.
4. Estimated delivery date (provided by CM). Provide storage if required to ensure CM's date is achieved.
5. Estimated assembly.
6. Startup up.
7.

4.11 Criteria 7 – Other Additional Information

The offeror may present unique or creative approaches that might be appropriate. The offeror may also provide supporting documentation that would be pertinent to this RFP.

5.0 EVALUATION CRITERIA PROCESS

A committee of University officials appointed by the Chief Procurement Officer will evaluate proposals and make a recommendation to the Chief Procurement Officer. The evaluation will be based upon the information provided in the proposal, additional information requested by the University for clarification, information obtained from references and independent sources and oral presentations (if requested).

The evaluation of responsive proposals shall then be completed by an evaluation team, which will determine the ranking of proposals. Proposals will be evaluated strictly in accordance with the requirements set forth in this solicitation, including any addenda that are issued. The University will award the contract to the responsible offeror whose proposal is determined to be the most advantageous to the University, taking into consideration the evaluation factors set forth in this RFP.

The evaluation of proposals will include consideration of responses to the list of criteria in Section 4.0. Offerors must specifically address all criteria in their response. Any deviations or exceptions to the specifications or requirements must be described and justified in a transmittal letter. Failure to list such exceptions or deviations in the transmittal letter may be considered sufficient reason to reject the proposal.

The relative importance of the criteria is defined below:

Primary Criteria

- Offeror Qualifications
- Quality of Construction
- Physical Size
- Ease of Maintenance
- Schedule
- Financial Offer

Secondary Criteria

- Other Additional Services

The University will evaluate proposals as submitted and may not notify offerors of deficiencies in their responses.

Proposals should contain responses to each of the criteria, listed in Section 4 even if the offeror’s response cannot satisfy those criteria. A proposal may be rejected if it is conditional or incomplete in the judgment of the University.

6.0 SPECIAL CONDITIONS

6.1 Contract Term

The successful Electrical Equipment Offeror will be issued a contract for the purchase of one single-ended unit substation consisting of an air switch, transformer, and distribution section in one assembly.

The successful Mechanical Equipment Offeror will be issued a contract for the purchase of 4 air handler units and 4 return fan units to be delivered to the site on the date listed. The contractor shall be responsible for removal from the truck and installation.

6.2 Effective Date

The effective date of the contract should be the date upon which the parties execute it and all appropriate approvals, including that of the Commonwealth of Kentucky Government Contracts Review Committee, have been received.

6.3 Competitive Negotiation

It is the intent of the RFP to enter into competitive negotiation as authorized by KRS 45A.085.

The University will review all proposals properly submitted. However, the University reserves the right to request necessary modifications, reject all proposals, reject any proposal that does not meet mandatory requirement(s) or cancel this RFP, according to the best interests of the University.

Offeror(s) selected to participate in negotiations may be given an opportunity to submit a Best and Final Offer to the purchasing agency. All information received prior to the cut-off time will be considered part of the offeror’s Best and Final Offer.

The University also reserves the right to waive minor technicalities or irregularities in proposals providing such action is in the best interest of the University. Such a waiver should in no way modify the RFP requirements or excuse the offeror from full compliance with the RFP specifications and other contract requirements if the offeror is awarded the contract.

6.4 Appearance Before Committee

Any, all or no offerors may be requested to appear before the evaluation committee to explain their proposal and/or to respond to questions from the committee concerning the proposal. Offerors are prohibited from electronically recording these meetings. The committee reserves the right to request additional information.

6.5 Additions, Deletions or Contract Changes

The University reserves the right to add, delete, or change related items or services to the contract established from this RFP. No modification or change of any provision in the resulting contract shall

be made unless such modification is mutually agreed to in writing by the contractor and the Chief Procurement Officer and incorporated as a written modification to the contract. Memoranda of understanding and correspondence should not be interpreted as a modification to the contract.

6.6 Contractor Cooperation in Related Efforts

The University reserves the right to undertake or award other contracts for additional or related work to other entities. The contractor shall fully cooperate with such other contractors and University employees and carefully fit its work to such additional work. The contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by University employees. This clause shall be included in the contracts of all contractors with whom this contractor will be required to cooperate. The University shall equitably enforce this clause to all contractors to prevent the imposition of unreasonable burdens on any contractor.

6.7 Entire Agreement

The RFP should be incorporated into any resulting contract. The resulting contract, including the RFP and those portions of the offeror's response accepted by the University, should be the entire agreement between the parties.

6.8 Governing Law

The contractor shall conform to and observe all laws, ordinances, rules and regulations of the United States of America, Commonwealth of Kentucky and all other local governments, public authorities, boards or offices relating to the property or the improvements upon same (or the use thereof) and will not permit the same to be used for any illegal or immoral purposes, business or occupation. The resulting contract shall be governed by Kentucky law and any claim relating to this contract shall only be brought in the Franklin Circuit Court in accordance with KRS 45A.245.

6.9 Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act

To the extent Company receives Personal Information as defined by and in accordance with Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act, KRS 61.931, 61.932 and 61.933 (the "Act"), Company shall secure and protect the Personal Information by, without limitation: (i) complying with all requirements applicable to non-affiliated third parties set forth in the Act; (ii) utilizing security and breach investigation procedures that are appropriate to the nature of the Personal Information disclosed, at least as stringent as University's and reasonably designed to protect the Personal Information from unauthorized access, use, modification, disclosure, manipulation, or destruction; (iii) notifying University of a security breach relating to Personal Information in the possession of Company or its agents or subcontractors within seventy-two (72) hours of discovery of an actual or suspected breach unless the exception set forth in KRS 61.932(2)(b)2 applies and Company abides by the requirements set forth in that exception; (iv) cooperating with University in complying with the response, mitigation, correction, investigation, and notification requirements of the Act , (v) paying all costs of notification, investigation and mitigation in the event of a security breach of Personal Information suffered by Company; and (vi) at University's discretion and direction, handling all administrative functions associated with notification, investigation and mitigation.

6.10 Termination for Convenience

The University of Kentucky, Procurement Services, reserves the right to terminate the resulting contract without cause with thirty (30) day written notice. Upon receipt by the contractor of a "notice of termination," the contractor shall discontinue all services with respect to the applicable contract. The cost of any agreed upon services provided by the contractor will be calculated at the agreed upon rate prior to a "notice of termination" and a fixed fee contract will be pro-rated (as appropriate).

6.11 Termination for Non-Performance

Default

The University may terminate the resulting contract for non-performance, as determined by the University, for such causes as:

- Failing to provide satisfactory quality of service, including, failure to maintain adequate personnel, whether arising from labor disputes, or otherwise any substantial change in ownership or proprietorship of the Contractor, which in the opinion of the University is not in its best interest, or failure to comply with the terms of this contract;

- Failing to keep or perform, within the time period set forth herein, or violation of, any of the covenants, conditions, provisions or agreements herein contained;

- Adjudicating as a voluntarily bankrupt, making a transfer in fraud of its creditors, filing a petition under any section from time to time, or under any similar law or statute of the United States or any state thereof, or if an order for relief shall be entered against the Contractor in any proceeding filed by or against contractor thereunder. In the event of any such involuntary bankruptcy proceeding being instituted against the Contractor, the fact of such an involuntary petition being filed shall not be considered an event of default until sixty (60) days after filing of said petition in order that Contractor might during that sixty (60) day period have the opportunity to seek dismissal of the involuntary petition or otherwise cure said potential default; or

- Making a general assignment for the benefit of its creditors, or taking the benefit of any insolvency act, or if a permanent receiver or trustee in bankruptcy shall be appointed for the Contractor.

Demand for Assurances

In the event the University has reason to believe Contractor will be unable to perform under the Contract, it may make a demand for reasonable assurances that Contractor will be able to timely perform all obligations under the Contract. If Contractor is unable to provide such adequate assurances, then such failure may be an event of default and grounds for termination of the Contract.

Notification

The University will provide ten (10) calendar days written notice of default. Unless arrangements are made to correct the non-performance issues to the University's satisfaction within ten (10) calendar days, the University may terminate the contract by giving forty-five (45) days notice, by registered or certified mail, of its intent to cancel this contract.

6.12 Funding Out

The University may terminate this contract if funds are not appropriated or are not otherwise available for the purpose of making payments without incurring any obligation for payment after the date of termination, regardless of the terms of the contract. The University shall provide the contractor thirty (30) calendar days' written notice of termination under this provision.

6.13 Prime Contractor Responsibility

Any contracts that may result from the RFP shall specify that the contractor(s) is/are solely responsible for fulfillment of the contract with the University.

6.14 Assignment and Subcontracting

The Contractor(s) may not assign or delegate its rights and obligations under any contract in whole or in part without the prior written consent of the University. Any attempted assignment or subcontracting shall be void.

6.15 Permits, Licenses, Taxes

The contractor shall procure all necessary permits and licenses and abide by all applicable laws, regulations and ordinances of all federal, state and local governments in which work under this contract is performed.

The contractor must furnish certification of authority to conduct business in the Commonwealth of Kentucky as a condition of contract award. Such registration is obtained from the Secretary of State, who will also provide the certification thereof. However, the contractor need not be registered as a prerequisite for responding to the RFP.

The contractor shall pay any sales, use, personal property and other tax arising out of this contract and the transaction contemplated hereby. Any other taxes levied upon this contract, the transaction or the equipment or services delivered pursuant hereto shall be the responsibility of the contractor.

The contractor will be required to accept liability for payment of all payroll taxes or deductions required by local and federal law including (but not limited to) old age pension, social security or annuities.

6.16 Attorneys' Fees

In the event that either party deems it necessary to take legal action to enforce any provision of the contract and in the event that the University prevails, the contractor agrees to pay all expenses of such action including attorneys' fees and costs at all stages of litigation.

6.17 Royalties, Patents, Copyrights and Trademarks

The Contractor shall pay all applicable royalties and license fees. If a particular process, products or device is specified in the contract documents and it is known to be subject to patent rights or copyrights, the existence of such rights shall be disclosed in the contract documents and the Contractor is responsible for payment of all associated royalties. To the fullest extent permitted by law the Contractor shall indemnify, hold the University harmless, and defend all suits, claims, losses, damages or liability resulting from any infringement of patent, copyright, and trademark rights resulting from the incorporation in the Work or device specified in the Contract Documents.

Unless provided otherwise in the contract, the Contractor shall not use the University's name nor any of its trademarks or copyrights, although it may state that it has a Contract with the University.

6.18 Indemnification

The contractor shall indemnify, hold and save harmless the University, its affiliates and subsidiaries and their officers, agents and employees from losses, claims, suits, actions, expenses, damages, costs (including court costs and attorneys' fees of the University's attorneys), all liability of any nature or kind arising out of or relating to the Contractor's response to this RFP or its performance or failure to perform under the contract awarded from this RFP. This clause shall survive termination for as long as necessary to protect the University.

6.19 Insurance

The successful Contractor shall procure and maintain, at its expense, the following minimum insurance coverages insuring all services, work activities and contractual obligations undertaken in this contract. These insurance policies must be with insurers acceptable to the University.

COVERAGES	**LIMITS**
Workers' Compensation	Statutory Requirements (Kentucky)
Employer's Liability	$500,000/$500,000/$500,000
Commercial General Liability including operations/completed operations, products and contractual liability (including defense and investigation costs), and this contract	$1,000,000 each occurrence (BI & PD combined) $2,000,000 Products and Completed Operations Aggregate
Business Automobile Liability covering owned, leased, or non-owned autos	$1,000,000 each occurrence (BI & PD combined)

The successful contractor agrees to furnish Certificates of Insurance for the above-described coverages and limits to the University of Kentucky, Procurement Services. The University, its trustees and employees must be added as additional insured on the Commercial General Liability policy with regard to the scope of this solicitation. Any deductibles or self-insured retention in the above-described policies must be paid and are the sole responsibility of the contractor. Coverage is to be primary and non-contributory with other coverage (if any) purchased by the University. All of

these required policies must include a Waiver of Subrogation (except Workers' Compensation) in favor of the University, its trustees and employees.

6.20 Method of Award

It is the intent of the University to award a contract to the qualified offeror(s) whose offer, conforming to the conditions and requirements of the RFP, is determined to be the most advantageous to the University, cost and other factors considered.

Notwithstanding the above, this RFP does not commit the University to award a contract from this solicitation. The University reserves the right to reject any or all offers and to waive formalities and minor irregularities in the proposal received.

6.21 Reciprocal Preference

In accordance with KRS 45A.494, a resident offeror of the Commonwealth of Kentucky shall be given a preference against a nonresident offeror. In evaluating proposals, the University will apply a reciprocal preference against an offeror submitting a proposal from a state that grants residency preference equal to the preference given by the state of the nonresident offeror. Residency and non-residency shall be defined in accordance with KRS 45A.494(2) and 45A.494(3), respectively. Any offeror claiming Kentucky residency status shall submit with its proposal a notarized affidavit affirming that it meets the criteria as set forth in the above reference statute.

6.22 Reports and Auditing

The University, or its duly authorized representatives, shall have access to any books, documents, papers, records or other evidence pertinent to this contract.

6.23 Confidentiality

The University recognizes an offeror's possible interest in preserving selected information and data included in the proposal; however, the University must treat such information and data as required by the Kentucky Open Records Act, KRS 61.870, et seq.

Information areas which normally might be considered proprietary, and therefore confidential, shall be limited to individual personnel data, customer references, formulae and company financial audits which, if disclosed, would permit an unfair advantage to competitors. If a proposal contains information in these areas and the offeror declares them to be proprietary in nature and not available for public disclosure, the offeror should declare in the Transmittal Letter the inclusion of proprietary information and shall noticeably label as confidential or proprietary each sheet containing such information. Proposals containing information declared by the offeror to be proprietary or confidential, either wholly or in part, outside the areas listed above may be deemed non-responsive and may be rejected.

The University's General Counsel shall review each offeror's information claimed to be confidential and, in consultation with the offeror (if needed), make a final determination as to whether or not the

confidential or proprietary nature of the information or data complies with the Kentucky Open Records Act.

6.24 Conflict of Interest

This Request for Proposal and resulting Contract are subject to provisions of the Kentucky Revised Statutes regarding conflict of interest and the University of Kentucky's Ethical Principles and Code of Conduct (www.uky.edu/Legal/ethicscode.htm). When submitting and signing a proposal, an offeror certifies that no actual, apparent or potential conflict of interest exists between the interests of the University and the interests of the offeror. A conflict of interest (whether contractual, financial, organizational or otherwise) exists when any individual, contractor or subcontractor has a direct or indirect interest because of a financial or pecuniary interest, gift or other activities or relationships with other persons (including business, familial or household relationships) and is thus unable to render or is impeded from rendering impartial assistance or advice, has impaired objectivity in performing the proposed work or has an unfair competitive advantage.

Questions concerning this section or interpretation of this section should be directed to the University purchasing officer identified in this RFP.

6.25 Personal Service Contract Policies

Not applicable.

6.26 Copyright Ownership and Title to Designs and Copy

The contractor and University intend this RFP to result in a contract for services, and both consider the products and results of the services to be rendered by the contractor hereunder to be a work made for hire. The contractor acknowledges and agrees that the work and all rights therein, including (without limitation) copyright, belong to and shall be the sole and exclusive property of the University. For any work that is not considered a work made for hire under applicable law, title and copyright ownership shall be assigned to the University.

Title to all dies, type, cuts, artwork, negatives, positives, color separations, progressive proofs, plates, copy and any other requirement not stated herein required for completion of the finished product for use in connection with any University job shall be the property of and owned by the University. Such items shall be returned to the appropriate department upon completion and/or delivery of work unless otherwise authorized by the University. In the event that time of return is not specified, the contractor shall return all such items to the appropriate University department within one week of delivery.

6.27 University Brand Standards

The contractor must adhere to all University of Kentucky Brand Standards. University Brand Standards are maintained by the University Public Relations Office (UKPR) and can be viewed at http://www.uky.edu/prmarketing/brand-standards. Non-adherence to the standards can have a penalty up to and including contract cancellation. Only the UKPR Director or designee can approve exceptions to the University standards.

Graphics standards for the UK HealthCare areas are governed by UK HealthCare Clinical Enterprise Graphic Standards, found at: https://ukhealthcare.uky.edu/staff/brand-strategy.

Contractor warrants that its products or services provided hereunder will be in compliance with all applicable Federal disabilities laws and regulations, including without limitation the accessibility requirements of Section 255 of the Federal Telecommunications Act of 1996 (47 U.S.C. § 255) and Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d), and its implementing regulations set forth at Title 36, Code of Federal Regulations, Part 1194. For purposes of clarity, updated regulations under Section 508 standards now incorporate WCAG 2.0, and for purposes of this agreement WCAG 2.0 Level AA compliance is expressly included. Contractor agrees to promptly respond to, resolve and remediate any complaint regarding accessibility of products or services in a timely manner and provide an updated version to University at no cost. If deficiencies are identified, University reserves the right to request from Contractor, a timeline by which accessibility standards will be incorporated into the products or services provided by Contractor and shall provide such a timeline within a commercially reasonable duration of time. Failure to comply with these requirements shall constitute a material breach of this Agreement and may be grounds for termination of this Agreement.

Where any customized web services are provided, Contractor represents that it has reviewed the University's Web Policy and all products or services will comply with its published standards.

Contractor will provide University with a current Voluntary Product Accessibility Template (VPAT) for any deliverable(s). If none is available, Vendor will provide sufficient information to reasonably assure the University that the products or services are fully compliant with current requirements.

6.28 Printing Statutes

Not applicable.

6.29 Requirement for Contract Administration Fee

Not applicable.

6.30 Payment Terms

The University adheres to a strategic approach regarding payables management based on risk minimization, processing costs, and industry best practices. As such, suppliers and individuals doing business with the University will be paid based on the following protocol:

1. The University utilizes Payment Plus (e-payables) as its primary default form of payment. By enrolling in Payment Plus, suppliers can receive payments immediately (all invoices will be paid immediately upon confirmation of goods receipt and invoice). The process is electronic and the supplier receives real-time payment notices. Additional information regarding Payment Plus (and enrollment form) can be found at: https://www.uky.edu/ufs/payment-plus-supplier-enrollment-form.

2. Payments by check. Payment terms for check payments are Net-30.

3. Individuals receiving payments from the University that require ACH direct payments will only be processed under special circumstances as approved by the Controller’s office. Payment terms for ACH are Net-30.

7.0 SCOPE OF SERVICES

7.1 Detailed Services Defined

Electrical: Provide a single-ended unit substation delivered to the site and packaged so that it can be taken down through the louver opening or through the loading dock and into the mechanical room through the existing door openings and installed around the existing structure.

Provide a factory-authorized representative to perform startup services as defined in NETA standards and as recommended by the manufacturer.

Provide one year warranty from substantial completion.

See the following drawings and specifications for scope of work.

1. Switchboard schedule.
2. Specifications section 261116.

Mechanical: Provide air handlers AHU-1,2,3,4 & RF-1,2,3,4 delivered to the site and packaged so that it can be taken down through the louver opening or through the loading dock and into the mechanical room through the existing door openings and installed around the existing structure.

Provide a factory-authorized representative to perform the following startup services:

1. Inspect field assembly of components and installation of central-station air-handling units including piping, ductwork, and electrical connections.
2. Prepare a written report on findings and recommended corrective actions.

Provide one year warranty from substantial completion.

See the following drawings and specifications for scope of work.

1. Drawings:
    a. M3.0, M4.0, M4.9, M6.3, M6.4, M7.0, M7.1, IC-2.01, IC-3.50, IC-3.53, IC-6.04, IC-6.07, IC-6.08, IC-6.09, IC-6.10, IC-6.11, IC-6.12, IC-6.13, IC-6.14, IC-7.01, IC-7.02, IC-7.03, IC-7.04, IC-7.05.
2. Specifications:
    a. 237323, 238216.11.

8.0 FINANCIAL OFFER SUMMARY

Offerors are to provide a fixed price for the services offered.

FINANCIAL OFFER SUMMARY

INDICATE WHETHER THE FINANCIAL OFFER IS FOR:

ELECTRICAL EQUIPMENT **MECHANICAL EQUIPMENT**

By circling the appropriate option above.

If you are submitting an offer for **BOTH**, attach a separate pricing sheet for each package and circle the appropriate equipment for each offer.

8.1 Equipment Pricing

Offerors are to provide a fixed price for the equipment listed within Section 7.0 $_____

Options to Specifications (itemized list attached) YES_____ NO_____

_____ $_____
_____ $_____
_____ $_____
_____ $_____

8.2 Equipment Delivery

Freight included in Price YES_____ NO_____
Freight estimate $_____
Method of Shipment _____
Transportation estimate (in days) _____
Shipment date after receipt of order _____
Shipment date after receipt of approval drawings _____

8.3 Drawings/Manuals

Approval Drawings to be submitted _____# of weeks after order.
"AS Built" Drawings to be submitted _____ # of weeks after construction completion.

8.4 Help wth Assembly

Provide contactor help with assemble? YES_____ NO_____

8.5 Start-up, Training, Spare Parts & Additional Services

No. of Start-up days included _____
No. of Training days included _____

Equipment Procurement – Electrical Switchgear

1. **Scope of Work**
   - A. Furnish Switchgear for the University of Kentucky – White Hall Project as specified by project bid documents.
   - B. It is intended that this equipment is to be purchased by Pepper Construction Company, and shipped to the installing electrical contractor for receipt of equipment.
     - i. This equipment will be shipped to the site or within 75 miles of the project site which is located at 140 Patterson Dr. Lexington, Kentucky 40506.
   - C. Acceptance of unmodified Purchase Order per attached Exhibit F.2 – PCCO -KY PO, Pepper Construction standard Purchase Order.
   - D. This purchase order between this awarded equipment vendor and Pepper Construction Company may be transferred to the installing Electrical Contractor, which will be announced at a later time.
     - i. Transfer of purchase order shall be inclusive of all bid documents and project requirements.
   - E. Delivery location will be selected by the installing contractor, and receipt of equipment will be coordinated between the electrical equipment vendor and installing contractor for timing, location, and unloading requirements.
     - i. If unloading at the project site all delivery requirements are listed within the project logistics as shown in Exhibit N, and vendor shall coordinate timing of delivery.
     - ii. Notification of shipment and delivery to be made at 7 Calendar Days, 48 hours, and 24 hours for delivery coordination. Coordinate with site contact Jonathan Wuchner - JWuchner@pepperconstruction.com.
   - F. Shop drawings shall be submitted to Pepper Construction with 14 calendar days upon issuance of the Purchase Order, unless otherwise agreed upon in post bid review meeting, with written notice prior to the post bid review meeting.
   - G. All equipment shall be shipped in accordance with Manufacturer's recommendations, and in a weatherproof covering(s) preventing damage to parts and components while shipping.
   - H. All equipment shall be compatible with the Building Automation System(s) as described in the contract documents.
   - I. This vendor shall provide field staff on site to support the installation of the Equipment, balancing and adjustments of the unit, commissioning, and coordination, prior to delivery, during the installation process, start-up, and commissioning.
     - i. This vendor shall include 40 hours of field start up and commissioning.
   - J. All short shipment are to be coordinated and approved by Pepper Construction and with installing contractor prior to shipping.
   - K. Warranties shall begin at the time of substantial completion, and shall be transferable to the installing contractor, and, or the end user.
   - L. This vendor shall include fuses as described in the contract and bidding documents.
   - M. This contractor shall include costs to expedite manufacturing and delivery of the equipment no later than August 4th 2025, however through expediting process equipment will be accepted as sooner.

ITEMS NOT INCLUDED IN THIS SCOPE OF WORK

A. Electrical Equipment Installation

SPECIFICATION SECTIONS:

A. 261116 – Secondary Unit Substations

Equipment Procurement – Air Handling and Hydronic Coil Equipment

1. **Scope of Work**
   - A. Furnish Air Handling and Hydronic Coil Equipment for the University of Kentucky – White Hall Project as specified by project bid documents.
   - B. It is intended that this equipment is to be purchased by Pepper Construction Company, and shipped to the installing mechanical contractor for receipt of equipment.
     - i. This equipment will be shipped to the site or within 75 miles of the project site which is located at 140 Patterson Dr. Lexington, Kentucky 40506.
   - C. Acceptance of unmodified Purchase Order per attached Exhibit F.2 – PCCO -KY PO, Pepper Construction standard Purchase Order.
   - D. This purchase order between this awarded equipment vendor and Pepper Construction Company may be transferred to the installing Mechanical Contractor, which will be announced at a later time.
     - i. Transfer of purchase order shall be inclusive of all bid documents and project requirements.
   - E. Delivery location will be selected by the installing contractor, and receipt of equipment will be coordinated between the equipment vendor and installing contractor for timing, location, and unloading requirements.
     - i. If unloading at the project site all delivery requirements are listed within the project logistics as shown in Exhibit N, and vendor shall coordinate timing of delivery.
     - ii. Notification of shipment and delivery to be made at 7 Calendar Days, 48 hours, and 24 hours for delivery coordination. Coordinate with site contact Jonathan Wuchner - JWuchner@pepperconstruction.com.
   - F. Shop drawings shall be submitted to Pepper Construction with 14 calendar days upon issuance of the Purchase Order, unless otherwise agreed upon in post bid review meeting.
   - G. All equipment shall be shipped in accordance with Manufacturer's recommendations, and in a weatherproof covering(s) preventing damage to parts and components while shipping.
   - H. All equipment shall be compatible with the Building Automation System(s) as described in the contract documents.
   - I. This vendor shall provide field staff on site to support the installation of the Equipment, balancing and adjustments of the unit, commissioning, and coordination, prior to delivery, during the installation process, start-up, and commissioning.
     - i. This Vendor shall include 128 hours of field start up and commissioning.
   - J. All short shipment are to be coordinated and approved by Pepper Construction and with installing contractor prior to shipping.
   - K. Warranties shall begin at the time of substantial completion, and shall be transferable to the installing contractor, and, or the end user.
   - L. This vendor shall include (7) Seven sets of prefilters, and (2) two sets of final filters for each unit.
   - M. This vendor shall include return fan equipment and shop drawings per the contract documents.
   - N. This vendor is to include VFD's.

ITEMS NOT INCLUDED IN THIS SCOPE OF WORK

- A. Equipment Installation

SPECIFICATION SECTIONS:

A. 237323 – Custom Air-Handling Systems
B. 238216.11 – Hydronic Air Coils

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION BY A CONSTRUCTION MANAGER AT RISK
University of Kentucky
Capital Construction Division

These General Conditions are binding upon the Construction Manager and all Sub-contractors as each are subject to the provisions contained herein.

ARTICLE 1 - DEFINITIONS

1.1 Wherever used in these General Conditions or in other Contract Documents, the following terms have the meaning indicated which are applicable to both the singular and plural thereof:

1.1.1 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS (ASI) - The term "ASI" means a written order issued by the Consultant that clarifies or interprets the Contract Documents, that orders minor changes in the Work, that does not require an adjustment in either cost or time, and that does not require a Change Order.

1.1.2 BUSINESS DAY – The term "Business Day" means a Calendar Day that is not a Saturday, Sunday or legal holiday in Fayette County, Kentucky.

1.1.3 CALENDAR DAY - The term "Calendar Day" means a day of twenty-four hours measured from midnight to the next midnight

1.1.4 CHANGE ORDER - The term "Change Order" means a written order to the Construction Manager, signed by the Owner and issued after the execution of the Contract, directing a change in the Work or an adjustment in the Contract Amount or the Contract Time. A Change Order may be an agreed change by the Construction Manager and the Owner or it may be a unilateral change by the Owner.

1.1.5 CONSULTANT - The term "Consultant" means the person and/or entity, whether singular or plural, either Architect, Engineer or other Consultant, who is or are identified as such in the Contract Documents.

1.1.6 CONSTRUCTION MANAGER or CONSTRUCTION MANAGER AT RISK (CM) - The term "Construction Manager" or "Construction Manager at Risk" (CM) means the person or entity who will or has entered into a contract with the Owner that assumes the risk for construction of the Project as the construction manager, and who will provide consultation and collaboration regarding the construction during and after design of the Project. The CM shall execute and hold all construction Trade Contracts and Purchase Orders for the Project.

1.1.7 CONTRACT - The term "Contract" means the Contract between Owner and Construction Manager and consists of all Contract Documents as defined in Article 1.1.10 of these General Conditions.

1.1.8 CONTRACT AMOUNT - The term "Contract Amount" means the sum stated in the Agreement which represents the total amount payable by the Owner to the Construction Manager for the performance of the Work under the Contract Documents, plus or minus adjustments as provided for in the Contract Documents or by approved Change Orders.

1.1.9 CONTRACT DOCUMENTS - The "Contract Documents" include the Agreement of Contract between the Owner and the Construction Manager (the "Agreement"); the Request for Proposal; the General Conditions; the Special Conditions; the Construction Manager's Form of

Proposal; the Construction Manager's Bonds; the Specifications, Drawings and Addenda for the construction of the Project which are to be used for bidding of the bid pack/Trade Contracts; and any Change Orders issued after execution of this Contract. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and any Sub-contractor, or any person or entity other than the Construction Manager. Documents not included or expressly contemplated in this Article do not, and shall not, form any part of the Contract for Construction. Without limiting the generality of the foregoing, shop drawings and other submittals from the Construction Manager or its Sub-contractors and suppliers do not constitute a part of the Contract Documents. Except as otherwise provided, where these Contract Documents obligate the Construction Manager to certain responsibilities or require the Construction Manager to perform certain actions, the Construction Manager may require these same responsibilities and/or actions of one or more Sub-contractors. However, assignment of such responsibilities or actions to one or more Sub-contractors shall not be construed to relieve the Construction Manager of its obligation to the University under this contract.–

1.1.10 CONTRACT TIME - The term "Contract Time", unless otherwise provided, means the specified number of consecutive Calendar Days following the stipulated commencement of the Work as stated in the Work Order, plus or minus adjustments as provided for by approved Change Orders, within which the Construction Manager shall complete the Work required by the Contract and shall achieve certification of substantial and final completion.

1.1.11 KRS REFERENCES - Reference to “KRS” means the "Kentucky Revised Statutes" adopted by the Commonwealth of Kentucky, including all laws that may have been revised, amended, supplemented or new laws enacted.

1.1.12 OWNER - The term "Owner" means the University of Kentucky, a statutory body corporate existing pursuant to Sections 164.100 et seq. of the Kentucky Revised Statutes.

1.1.13 PROJECT - The term "Project" means the total construction of the Work performed under the Contract Documents, which may be the whole or a part, and which may include construction by the Owner or by separate contracts.

1.1.14 PROJECT MANAGER - The term "Project Manager", when used alone, means the Owner's representative responsible for administration and management of the Project. The Owner's Project Manager during construction shall be the designated University of Kentucky Capital Projects Management Project Manager that is in charge of the Project. The term “CM Project Manager” means the individual employed by the Construction Manager who is assigned to the Project to provide overall management during both the design and construction phases of the Project, and who has total responsibility for the successful completion of the Project

1.1.15 PROVIDE - The term "Provide," as used throughout the specifications, shall mean furnish, install and pay for.

1.1.16 SHOP DRAWINGS - The term "Shop Drawings" means drawings, diagrams, schedules, and other data specially prepared for the Work by the Construction Manager or any Sub-contractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

1.1.17 SUBSTANTIAL COMPLETION - The term "Substantial Completion" is the point at which, as certified in writing by the Owner, a project is at the level of completion, in strict compliance with the contract, where (a) necessary approval by public regulatory authorities (and by other authorities having jurisdiction or as identified in Article 11.2, as necessary) has been given; (b) the Owner has received all required warranties and documentation, and (c) the Owner may enjoy beneficial use or

occupancy and may use, operate, and maintain the project in all respects, for its intended purpose. Partial use or occupancy shall not necessarily result in the project being deemed substantially complete and shall not be evidence of Substantial Completion. In order for the Owner to enjoy beneficial use or occupancy and use, operate, and maintain the project in all respects, for its intended purpose, the stage or progress of the Work or a designated portion thereof shall be sufficiently complete, accessible, operable and usable, and all parts, systems and site Work shall be 100% complete, cleaned and available for the Owner's full use without interruption in accordance with the Contract Documents, including but not limited to the provisions of Article 28 of these General Conditions. The Work will not be considered acceptable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and approvals provided to the Owner, designated instruction of the Owner's personnel in the operation of systems has been completed, and all final finishes within the Contract Documents are in place. In general, the only remaining Work shall be minor in nature so that the Owner and/or the Owner's tenants could occupy the Project on that date and the completion of the Work by the Construction Manager would not materially interfere or hamper the Owner's or the Owner's tenants' normal business operations. As a further condition of Substantial Completion acceptance, the Construction Manager shall certify in writing that all remaining Work, the same being solely of a "punch list" nature, will be completed within thirty (30) consecutive Calendar Days following the date of Substantial Completion.

1.1.17.1 The parties agree that "substantial completion" as defined in Article No. 2 of the Agreement and Article 1 of the General Conditions, as extended by approved Change Order(s) pursuant to Article 18.1 of the General Conditions, shall be the "date of completion specified in the contract" for purposes of KRS. 45A.250(2).

1.1.18 SUB-CONTRACTOR - The term "Sub-contractor" means the person, company, corporation, joint venture or other legal entity with whom the Construction Manager has executed a Contract for a portion of the Work.

1.1.19 WORK - The term "Work" means the scope of construction and services required by the Contract Documents and all approved Change Orders, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Construction Manager to perform and complete the Construction Manager's obligations under the Contract in an expeditious, orderly and workmanlike manner. The Work may constitute the whole or a part of the Project.

1.1.20 WORK ORDER - The term "Work Order" means a written notice by the Owner to the Construction Manager authorizing the Construction Manager to commence Work under the Contract and establishing the beginning date from which the time for Substantial and Final Completion shall be established.

1.1.21 UNIT PRICE - The term "Unit Price" means the amount per unit of measurement for materials or services as described in the bid documents.

ARTICLE 2 - CONSULTANT

2.1 The Consultant will be the Owner's representative during construction and until the Work is complete. The Consultant will advise and consult with the Owner. The Owner's instructions to the Construction Manager may be forwarded through the Consultant.

2.2 The Consultant will regularly, but no less frequently that monthly, visit the site to become familiar with the progress of the Work, the quality of the Work being provided and to determine if the

Work is proceeding in accordance with the Contract Documents. On the basis of these on-site inspections, the Consultant will inform the Owner of the progress of the Work, will advise the Owner of any defects and deficiencies observed in the Work and, when appropriate, will certify to the Owner that the Work in place equals or exceeds the amount requested by the Construction Manager on all applications for progress payments.

2.2.1 If applicable for the Work, the Consultant will verify to the Owner that the Construction Manager is performing erosion prevention and sediment control inspections as required by the Kentucky Division of Water Construction General Permit (KYR10) at least once every 7 days and shall include the findings in the site visit reports.

2.3 The Consultant will be the interpreter of the requirements of the drawings and specifications and any changes made to the drawings and specifications.

2.4 Claims, disputes, and other matters in question that arise relating to the execution or the progress of the Work shall be referred in writing to the Consultant by the Construction Manager. The Consultant will provide a response in accordance with and subject to the provisions of Article 38 of these General Conditions.

2.5 The Consultant will have the authority to reject Work which does not conform to the Contract Documents or to the required level of quality and performance.

2.6 The Consultant will review and approve, or take other appropriate action upon receipt of the Construction Manager's submittals such as Shop Drawings, product data, and samples. The review of submittals will be for general conformance with the design concept of the work, and for compliance with the information provided by the Contract Documents. Such review will not relieve the Construction Manager of any responsibility for errors or omissions in submittals, and will in no way constitute a waiver of or change to the requirements of the Contract Documents.

2.6.1 The Consultant’s review and response will be completed with reasonable promptness with a goal of ten (10) business days or less. The Consultant’s review of a specific item shall not indicate approval of an assembly of which the item is a component.

2.7 The Consultant will prepare Change Orders for the Owner to direct changes in the Work. Minor changes in the Work, not involving modifications to the contract cost or completion times and that are consistent with the purpose of Work, may be directed by the Consultant through Architect’s Supplemental Instructions (ASI).

2.8 When requested by the Construction Manager, the Consultant will conduct inspections to determine if the Project is at the level of completion required by and is in strict compliance with the Contract such that the Owner may enjoy beneficial use or occupancy and may use, operate, and maintain the project in all respects for its intended purpose, as further defined in the Contract. If the level of completion warrants, the Consultant will confirm that all necessary approvals by public regulatory authorities or other authorities having jurisdiction have been given, will confirm that the Owner has received all required warranties and documentation, will recommend dates for certification of Substantial Completion and Final Completion by the Owner, and will complete and submit the Notice of Termination of coverage under the KPDES General Permit for Storm Water Discharges Associated with Construction Activity.

2.9 The Construction Manager will accept direction for the Work on the Project only from the Owner's Project Manager or from the Consultant. Requests for information from the Construction Manager shall be directed to the Consultant.

ARTICLE 3 - CORRELATION AND INTENT OF CONTRACT DOCUMENTS

3.1 Execution of the Contract by the Construction Manager is a representation that the Construction Manager has or shall thoroughly and carefully examine the site of the of Work; shall timely investigate all conditions which can affect the Work or its cost, including but not limited to availability of labor, materials, supplies, water, electrical power, roads, access to the site, uncertainties of weather, water tables, the character of equipment and facilities needed to perform the Work, and local conditions under which the Work is to be performed; and further, that the Construction Manager shall insure that the documents issued for bidding by Sub-contractors reflect the results of this investigation and are adequate to complete the Work. It is the responsibility of the Construction Manager to be familiar with and comply with all Federal, State, and local laws, ordinances, and regulations which might affect those engaged in the Work, and to be familiar with the materials, equipment, or procedures to be used in the Work, or which in any other way could affect the completion of the Work. The Construction Manager shall carefully study and compare the Contract Documents with each other and with other information provided to the Construction Manager by the Consultant or the Owner pursuant to the Contract Documents and shall notify the Owner and the Consultant in writing of any errors, inconsistencies or omissions in the Contract Documents recognized by the Construction Manager. Any failure to properly familiarize itself with the proposed Work shall not relieve the Construction Manager from the responsibility for completing the Work in accordance with the Contract Documents.

3.2 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Construction Manager. All labor or materials which are reasonably inferable from the Contract Documents and which are necessary to produce the desired result, even though not specifically mentioned in the Contract Documents, shall be included in the Work at no additional cost to the Owner.

3.3 In the event a question arises regarding the meaning or intent of the Contract Documents, the Construction Manager shall report it by preparing an RFI in eCommunication® to the Consultant. The Consultant shall furnish, with reasonable promptness and with a goal of three (3) business days and by whatever means as may be appropriate, additional instructions necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom. The Work shall be executed in conformity therewith and the Construction Manager shall do no Work without proper drawings and instructions. Items indicated on drawings as "N.I.C." or "Not In Contract" are shown for explanation purposes only and are not to be included in this Contract.

3.4 The Contract Documents are complementary, and what is required by one shall be binding as if required by all. In case of conflicts between the various documents, the order of precedence will be as follows: (1) Addenda, (2) Special Conditions, (3) General Conditions, (4) Technical provisions of the Specifications and (5) Drawings.

3.5 Any notice to the Construction Manager from the Owner regarding this Contract shall be in writing and delivery and service of such notice shall be considered complete when sent by certified mail to the Construction Manager at Construction Manager's last known address. Such notice may also, at the Owner's election, be hand-delivered to the Construction Manager or the Construction Manager’s authorized representative.

ARTICLE 4 - PRE-CONSTRUCTION CONFERENCE

4.1 Following the execution of the Contract, a pre-construction conference will be held. Representatives of the Capital Project Management Division, Consultant, Construction Manager, and all major Sub-contractors shall be present to discuss the time for construction, methods and plan of operation, authority of the Consultant, procedures for handling shop drawings, progress estimates and requests for payments, and other relevant issues. The time and location of this meeting will be the responsibility of the Construction Manager in consultation with the Consultant, Owner and other interested parties.

4.2 Environmental aspects of the project, including erosion prevention and sediment control (EPSC) and storm water management shall be discussed during this conference. The Group shall discuss the Storm Water Pollution Prevention Plan (SWPPP) to ensure that all parties understand the requirements. During this meeting the responsibility for reading the rain gage on a daily basis will be established. The Construction Manager will identify the initial measures to be installed prior to land disturbing activities beginning. Any modifications to the SWPPP due to constructability issues should be discussed at this conference.

ARTICLE 5 - SHOP DRAWINGS

5.1 The Construction Manager shall submit a shop drawing and product sample submittal schedule to the Consultant establishing dates for the submission of Shop Drawings and product samples prior to the submittal of the Construction Manager's first application for payment for construction phase services. The schedule shall have been coordinated with all Sub-contractors and material suppliers as well as the Construction Manager’s construction schedule and shall allow for adequate and reasonable time for review of the samples and submittals by the Consultant. The Construction Manager shall be responsible for compliance with the submittal schedule and shall insure that the submittal schedule is maintained in order to accurately reflect the status of processing all required submittals.

5.2 The Construction Manager shall review product samples and Shop Drawings for compliance with the requirements of the Contract Documents, and shall submit them to the Consultant in accordance with submittal procedure and schedule established. The Construction Manager's review and submittal to the Consultant of any Shop Drawing or sample shall constitute a representation to the Owner and Consultant that a) the Construction Manager has determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or assumes full responsibility for doing so, and that b) each Shop Drawing or sample has been reviewed or coordinated with the requirements of the Work and the Contract Documents. Shop Drawings and submittal requirements shall not be deemed satisfied until approvable documents are received by the Consultant. Incorrect or incomplete submittals will be returned to the Construction Manager without action. No claim for additional time or extension of the contract will be considered if such claim is the result of failure by the Construction Manager to provide correct, accurate, complete and approvable submittals.

5.3 The Consultant will review submittals with reasonable promptness, and take appropriate action or return submittals to the Construction Manager for corrections as may be required. The Construction Manager shall make any corrections required by the Consultant for compliance with the Contract and shall return the required number of corrected copies of Shop Drawings and resubmit new samples until approved. The Construction Manager shall direct specific attention, in writing, or on resubmitted Shop Drawings, to revisions other than the corrections called for by the Consultant on previous submissions.

5.4 Where a Shop Drawing or sample submission is required by the specifications, no related Work shall be commenced until the submission has been accepted in writing by the Consultant. The review and acceptance shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The acceptance of a separate item will not indicate acceptance of the assembly in which the item functions. A copy of each accepted Shop Drawing and product sample shall be kept in good order by the Construction Manager at the site and shall be made available to the Consultant on request.

5.5 The Consultant's acceptance of Shop Drawings or samples shall not relieve the Construction Manager from the responsibility for any deviations from the requirements of the Contract Documents unless the Construction Manager has in writing called the Consultant's attention to such deviation at the time of submission and the Consultant has given written approval to the specific deviation. Any acceptance by the Consultant does not relieve the Construction Manager from responsibility for errors or omissions in the Shop Drawings.

ARTICLE 6 - LAYING OUT WORK

6.1 The Construction Manager will secure all data at the site of the building such as grades of lot, convenience of receiving and sorting material, location of public services, and other information which will have a bearing proposals or on the execution of the Work and shall address these issues in the preparation of scopes of work for the Subcontract bid packages. No allowance shall be made for failure of the Construction Manager to obtain such site information prior to submitting their proposal or to include such information in the Subcontract bid packages, and no adjustment to the Construction Manager's Contract amount or stipulated time for completion shall be allowed when due to failure by the Construction Manager to do so.

6.2 The Construction Manager shall be responsible for all lines, levels and measurements of all Work executed under the Contract. The Construction Manager shall verify all dimensions before laying out the Work and will be held responsible for any error resulting from failure to do so. Working from lines and levels established by the property survey or by other Contract Documents, and as shown in relation to the Work, the Construction Manager will establish and maintain bench marks and other dependable markers to set lines and levels for Work at each area of construction and elsewhere on the site as needed to properly locate each element of the entire Project. The Construction Manager shall calculate and measure from the bench marks and dependable markers required dimensions as shown (within recognized tolerances if not otherwise indicated), and shall not scale drawings to determine dimensions. The Construction Manager shall advise Sub-contractors and trades persons performing Work of marked lines and levels provided for their use in layout work. The Construction Manager shall verify layout information shown on drawings as required for the Work.

6.3 The Construction Manager shall be responsible for coordination of the installation of all elements of the Work, including preparation of coordination drawings if required by the Contract Documents or deemed necessary by the Construction Manager for performance of the Work.

6.4 If any encroachments are made by the Construction Manager or any Sub-contractor on any adjacent property, the Construction Manager shall, at the Construction Manager's expense, and within thirty (30) Calendar Days after written notice from the Owner or the Consultant, correct any encroachments and obtain approval from the owner of such adjacent property for any encroachments that cannot be feasibly corrected. The Construction Manager shall not be entitled to any adjustment to the Contract Amount or the Contract Time as a result of any such encroachment or the correction thereof.

ARTICLE 7 - PLANS, DRAWINGS, SPECIFICATIONS AND RECORD DRAWINGS

7.1 Unless otherwise provided in the Contract Documents, the Owner will furnish the Construction Manager free of charge one electronic or reproducible copy of the Drawings and Specifications for execution of the Work. The Construction Manager shall pay for the cost of duplication of all sets required over and above this amount.

7.2 The cost of additional plans, specifications and official contract documents for use by Sub-contractors for bidding and for construction shall be borne by the Construction Manager or by the Sub-contractors. Arrangements for orders and payment for plans, specifications and other contract documents must be made with Lynn Imaging, Lexington, Kentucky (http://www.ukplanroom.com) or by phone at 1.800.888.0693 or 859.255.1021) before a set of documents will be issued.

7.3 The Construction Manager shall keep one copy of all Contract Documents, including Drawings, Specifications and Shop Drawings on the site and in good order. A qualified representative of the Construction Manager shall record on these documents, from day to day as Work progresses, all changes and deviations from the Contract Documents. Prior to Substantial Completion, the Construction Manager shall complete and turn over to the Consultant the As-Built drawings, with a digital copy (in PDF format) submitted to the Owner simultaneously. The As-Built drawings shall consist of a set of drawings which indicate all field changes that were made to adapt to field conditions, changes resulting from Change Orders and all concealed and buried installations of piping, conduit and utility services. All buried and concealed items, both inside and outside the facility, shall be accurately located on the As-Built drawings as to depth and in relationship to not less than two permanent features such as interior or exterior wall faces. The As-Built drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in a contrasting color. For any changes or corrections in the Work which are made subsequent to the Substantial Completion Inspection, revisions shall be made to the As-Built drawings and submitted to the Consultant prior to final payment. Approval of the final payment request shall be contingent upon compliance with these provisions.

7.4 All drawings, specifications and copies thereof, furnished by the Consultant to the Owner, are the property of the University of Kentucky. They shall not be used by the Consultant, Construction Manager, or any Sub-contractor or Supplier on any other Project.

ARTICLE 8 - TEMPORARY UTILITIES

8.1 The Construction Manager shall provide and pay for, unless modified in the Special Conditions, all temporary conveniences including, but not limited to, wiring, lighting, power and electrical outlets, heat, water, and sanitary facilities required for construction. In the event the Owner elects to make available, at no cost to the Construction Manager, the electric power required for construction activities, the electric power supplied shall not be utilized as a means to provide temporary heat or for welding.

8.2 The Construction Manager is responsible for paying all utility costs, whether the costs are from an outside utility company or from the University, for utility services used in the course of completing the Work. The Construction Manager shall provide temporary heating, ventilation, telephones, water, electricity, portable gas, lighting for the Work, safety lighting, security lighting, and trash removal/dumpster service for both Construction Manager and Sub-contractor use during the Project. Work and safety lighting shall be provided continuously during working hours. Security lighting shall be provided at all hours of darkness.

ARTICLE 9 - MATERIALS, EQUIPMENT, APPLIANCES, AND EMPLOYEES

9.1 Unless otherwise provided in the Contract Documents, the Construction Manager shall provide and pay for all materials, labor and personnel, tools, equipment, construction equipment and machinery, utilities, supplies, appliances, transportation, taxes, temporary facilities, licenses, permits and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and the proper execution and completion of the Work safely, without damage to persons and property, and in compliance with all applicable law. The Construction Manager shall furnish, erect, maintain, and remove at the completion of the Contract, all temporary installations as may be required during the construction period.

9.2 Immediately following the execution of each of the Trade Contracts, the Construction Manager shall determine the source of supply for all materials required under that Trade Contract and the length of time required for their delivery, and shall assure that orders are placed for such materials in sufficient time to assure delivery to the site so that such materials are available to be incorporated into the Work when needed to comply with the schedule of Work.

9.3 The Construction Manager shall immediately notify the Consultant in writing of any known problems with the procurement, fabrication or ordering of any materials. Unless changes are approved in writing by the Consultant, the Construction Manager will not be excused for delays in securing materials specified.

9.4 The Construction Manager or Sub-contractors shall not place purchase orders or issue contracts for materials, supplies, equipment and services necessary to complete this Project using the name of the University of Kentucky. All orders placed by the Construction Manager that are related to this Project must use the name of the Construction Manager or Sub-contractor placing the order. The use of the University of Kentucky's name for ordering purposes is strictly prohibited. Payment for all goods and services required for the completion of the Work is the sole responsibility of the Construction Manager. Any invoices received at the University that are related to this Project will be immediately forwarded to the Construction Manager. Copies of these invoices will be made and placed in the Construction Manager's file and proof must be provided that these invoices have been paid in full prior to the processing of the next scheduled application for progress payment.

9.5 The route for delivery of all materials to the Project shall be coordinated with the Owner's Project Manager.

9.6 The Construction Manager shall be responsible for the proper and adequate storage of materials and equipment. Unless otherwise provided in the Contract Documents, all materials shall be of good quality and new. Workmanship and materials supplied and incorporated into this Work shall be of first quality. The Construction Manager, if required, shall furnish satisfactory evidence as to the kind and quality of materials.

9.7 The Construction Manager shall at all times enforce strict discipline and good order among all employees and Sub-contractors. The conduct of all individuals performing Work or operations related to the Work is the responsibility of the Construction Manager. The consumption of alcohol or drugs on the job by any workers is strictly prohibited. Any individual apprehended under the influence of alcohol or drugs on the premises at any time shall be subject to automatic removal from the Project by the Construction Manager, the Consultant or the Owner. Improper conduct of any kind will not be permitted and may result in the offending individual, Sub-contractor or Construction Manager being barred from the Owner's premises. The Construction Manager shall not permit the employment on the Project of any person unfit or not skilled in the Work assigned.

ARTICLE 10 - ROYALTIES AND PATENTS

10.1 The Construction Manager shall pay all royalties and license fees. If a particular process, product or device is specified in the Contract Documents and it is known to be subject to patent rights or copyrights, the existence of such rights shall be disclosed in the Contract Documents and the Construction Manager is responsible for payment of all associated royalties. The Construction Manager hereby agrees to indemnify, defend and hold the Owner, and any subsidiary, parent, or affiliates of the Owner, or other persons or entities designated by the Owner, and their respective directors, officers, agents, employees and designees (collectively, the "Indemnities") harmless from all losses, claims, liabilities, injuries, damages and expenses, including attorneys' fees and legal expenses, that the Indemnities may incur as a result of the Construction Manager's failure to strictly comply with its obligations under this Paragraph 10.1.

ARTICLE 11 - SURVEYS, PERMITS, REGULATIONS, AND STANDARD CODES

11.1 The Owner will furnish only such surveys that are specifically required by the Contract Documents. Approvals, assessments, and easements for permanent structures or permanent changes in existing structures shall be secured and paid for by the Owner, unless otherwise specified. All required utility tap-on fees shall be secured and paid for by the Construction Manager, or included in a Trade Contract, including the Lexington-Fayette Urban County Government (LFUCG) sewer tap-on fee**.** All construction permits, where required by local ordinances, except excavation permit, shall be obtained by the Construction Manager, but no fee shall be charged to or paid by the Construction Manager as the Owner is exempt from such charges. A Contractor's license fee for doing business in the locale, if applicable, shall be paid for by the Construction Manager.

11.2 All branches of Work shown on the plans and specifications shall be executed in strict compliance with all state and federal regulations and codes, with all national codes, and with the requirements of both ADA and JCAHO when applicable.

11.3 The Contractor, on projects disturbing 1 acre or more, or projects less than 1 acre that are part of a large common development plan, including grading, clearing, excavation, material laydown or other earth moving activities, shall assure full compliance with the requirements of the KYR10 and shall:

11.3.1 File a Notice of Intent (KPDES FORM eNOI-SWCA) with the Kentucky Division of Water and copy the UKCPM Project Manager and Water Quality Manager prior to the start of any excavation, grading or site development work.

11.3.2 The permittee (contractor) shall develop a Stormwater Pollution Prevention Plan (SWPPP) based on the Erosion Prevention and Sediment Control Plan (EPSC) as a minimum design standard. Ensure all requirements of KYR10 are fully addressed in the SWPPP. **Once the SWPPP is written, forward a copy to the Capital Projects Project Manager and to the Water Quality Manager for approval. Work cannot begin until SWPPP is approved and permit coverage obtained.**

11.3.3 Install BMP's such as, basins, traps, drainage, and sediment barriers before beginning land disturbing activities, including the construction entrance/exit. Once prevention measures have been installed, grading can commence. In the event a new construction entrance is added to the site, this new entrance must be built according to the EPSC design details with a wheel wash, a water supply and a sediment catch basin for washed wheel sediment.

11.3.4 Maintain all measures in working condition. Perform maintenance activities identified during inspections prior to the next rain event. Remove sediment from BMPs when 1/3 the storage volume has been filled.

11.3.5 Stabilize disturbed areas within 14 days of inactivity or reaching final grade on any portion of the site according to permit requirements.

11.3.6 Inspect the site every 7 calendar days and after each rainfall of ½"or more. Document site conditions, rainfall, maintenance activities needed and performed, stabilization needed and performed, and where new measures are needed. Discuss deficiencies with UK Project Manager and Water Quality Manager and note on the SWPPP Inspection Sheets.

Per the KPDES Permit, Section 2.1.7. "Inspections – Permittee Conducted". "Inspections shall be performed by personnel knowledgeable and skilled in assessing conditions at the construction site that could impact storm water quality and assessing the effectiveness of erosion prevention measures, sediment control measures, and other site management practices chosen to control the quality of the storm water discharges. Inspectors shall have training in storm water construction management such as Kentucky Erosion Prevention & Sediment Control (KEPSC), Certified Professional in Stormwater Quality (CPSWQ), Certified Erosion, Sediment and Stormwater Inspector (CESSWI), or other similar training."

Inspections shall include a tour of the total site and verification that all BMPs are performing as constructed. Inspector shall certify that all observations are correct as stated and sign and date the inspection form.

11.3.7 Keep Permit, SWPPP, weekly/rain event inspections sheets in binder in construction trailer. Any BMP change/alteration from SWPPP and EPSC plan must be noted on the EPSC and SWPPP.

11.3.8 **No soil and sediment shall leave the construction site. BMPs shall be repaired immediately if failure has occurred. No Mud shall be permitted on any street. All entrances/exits shall have a means by which to wash wheels. If an entrance/exit does not have a wheel wash, that exit shall not be used in muddy conditions. If for any reason mud is tracked offsite, the area must be cleaned in such a way as to prevent sediment from entering the storm sewer system. The use of tractor brooms solely will not be permitted.**

11.3.9 When it is necessary to dewater an excavation, proper BMPs must be implemented. Dewatering filter bags must be sized and used according to manufacturer's requirements and Standard Operating Procedures for Dewatering Bags.

11.3.10 UK (the MS4) routinely inspects sites for compliance with the EPSC/SWPPP. Any deficiencies noted become record for the Kentucky Division of Water and shall be remedied/installed as soon as site conditions are favorable but no more than 7 days from the inspection date.

11.3.11 At the conclusion of the project and all bare areas, slopes and ditches are 70% vegetated with the permanent ground cover, the contactor shall notify the UK Project Manager and Water Quality Manager and request a final site inspection prior to filing a "Notice of Termination (NOT) with the state. This inspection verifies that Construction BMPs can be removed, and Post-Construction BMPs are in place and functioning.

11.3.12 **Failure of the site contractor (permitee of the KPDES Permit) to timely comply with requirements of KPDES, the Construction Manager shall inform the site contractor that a third party contractor shall be retained to remediate all BMP deficiencies immediately, and all third party costs shall be passed to the permitee of the KPDES Permit. Any fines or other costs**

resulting from failure to comply, levied against the Owner will be assessed against the Construction Manager's or General Constructor's funds.

11.3.13 Refer to 334000S01 STORM DRAINAGE UTILITIES – Information for Consultants & Contractors.

11.3.14 Reference to standards, codes, specifications, and regulations refer to the latest edition of printing in effect at the date of issue shown in the Contract Documents unless another date is implied by the suffix number of the standard.

11.4 Reference to standards, codes, specifications, and regulations refer to the latest edition of printing in effect at the date of issue shown in the Contract Documents unless another date is implied by the suffix number of the standard

11.5 The Construction Manager shall furnish a final occupancy permit from the proper agency or agencies as required.

11.6 The Construction Manager shall, by provision within each applicable subcontract or by inclusion in the lump sum fee proposed to the Owner, insure the payment of all sales, consumer, use and similar taxes for materials, equipment and supplies incorporated into the Work, by unless otherwise specified in the bid documents.

ARTICLE 12 - PROTECTION OF WORK, PROPERTY, AND PUBLIC

12.1 The Construction Manager shall continuously maintain adequate protection of all Work from damage and shall protect the Owner's property from injury or loss arising in connection with this Contract. Except as otherwise covered by Builder's Risk insurance, the Construction Manager shall pay for any damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner. The Construction Manager shall adequately protect adjacent property as provided by law and the Contract Documents.

12.2 In an emergency affecting the safety of life, or of the Work, or of adjoining property, the Construction Manager, without special instruction or authorization from the Consultant or the Owner, is obligated to act to prevent such threatened damage, loss or injury.

12.3 The Construction Manager shall maintain fire protection as required by the Kentucky Building Code. Access to the Project site and surrounding buildings for local fire truck access during construction must be maintained. The Construction Manager shall maintain construction to allow access to new, existing or temporarily relocated standpipes, fire hydrant connections and fire alarm communication panels pursuant to Section 3018.8 of the Kentucky Building Code. If the Construction Manager utilizes the Owner's fire protection equipment, the Construction Manager shall replace any such materials lost, consumed or misplaced during the Contract period. The Construction Manager is responsible for any false alarms caused by dust created in the Work area or dust traveling to areas beyond the Work area due to inadequate dust protection barriers. Should there be a need for any existing or newly installed fire alarm system, or parts of a system that requires service, to be removed from service or disconnected, prior approval must be obtained from the Owner and the Construction Manager shall immediately provide alternate protection such as a fire watch until such systems are returned to full normal operations. When work or service is completed on a disabled fire alarm system, the Owner shall be immediately notified so the system can be placed in service.

12.4 The Construction Manager and Sub-contractors are responsible for the security of their own materials, tools and equipment at the Project site.

12.5 The Construction Manager shall provide to the Owner's Project Manager a key to Construction Manager's field office or job trailer.

ARTICLE 13 - BLASTING

13.1 Blasting is not allowed unless permission is granted in the Special Conditions. Should blasting be allowed by the Special Conditions, it shall be completed in accordance with all laws, regulations, ordinances and instructions contained in the Special Conditions.

ARTICLE 14 - CONSTRUCTION AND SAFETY DEVICES

14.1 The Construction Manager shall provide safety controls for protection of the life and health of employees and visitors. The Construction Manager will utilize precautionary methods for the prevention of damage to property, materials, supplies, and equipment, and for avoidance of work interruptions in the performance of this Contract. In order to provide such safety control, the Construction Manager shall comply with all pertinent provisions of the Kentucky Fire Prevention Code, Kentucky Building Code, Kentucky Labor Cabinet's Division of Occupational Safety and Health Program Construction Standards and Federal Occupational Safety and Health (Construction) Standards that are in effect at the time the Contract is entered into and during the period in which the Contract is to be performed.

14.2 The Construction Manager shall provide a written safety program which includes all pertinent written specialty standards such as, but not limited to, Control of Hazardous Energy Sources (Lockout/Tagout), Hazard Communications Program, First Aid, Blood Borne Pathogen Program, Respirator Use Program and Hearing Conservation Program. The Construction Manager shall require all Sub-contractors to have an effective written safety program or be required to follow the Construction Manager's written safety program.

14.3 The Construction Manager shall maintain an accurate record of and shall report to Kentucky Labor Cabinet's Division of Occupational Safety and Health in the manner and on the forms prescribed by that Division, exposure data and all accidents resulting in death, traumatic injury, or occupational disease. The Construction Manager shall maintain an accurate record of and shall report to the Owner's Project Manager, any damage to property, materials, supplies, or equipment incident to Work under this Contract.

14.4 The Kentucky Labor Cabinet's Division of Occupational Safety and Health may notify the Construction Manager of any noncompliance with the foregoing provisions. The Construction Manager shall, upon receipt of such notice, immediately correct the cited conditions. Notice delivered to the Construction Manager or the Construction Manager's representative at the site of the Work shall be deemed sufficient for this purpose. If the Construction Manager fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. Failure or refusal to comply with the order will be grounds for reducing or stopping all payments due under the Contract to the Construction Manager. No part of the construction time lost due to any such stop order shall be cause for, or the subject of a claim for, extension of time or for additional costs or damages by the Construction Manager.

14.5 The Construction Manager or any Sub-contractor shall immediately contact the University of Kentucky's Department of Occupational Health and Safety through the Owner’s Project Manager

should they be selected for an inspection by the Kentucky Occupational Safety and Health Compliance Division.

14.6 Compliance with the provisions of the foregoing sections by Sub-contractors shall be the responsibility of the Construction Manager.

14.7 Nothing in the provisions of this Article 14 shall prohibit the U.S. Department of Labor or the Kentucky Department of Labor Division of Occupational Safety and Health from enforcing pertinent occupational safety and health standards as authorized under Federal or State Occupational Safety and Health Standards.

14.8 The Construction Manager shall take all necessary precautions for the safety of employees on the Work, and shall comply with all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. If the Construction Manager or any Sub-contractor has questions related to the health or safety required by their written safety program, they should contact the Kentucky Labor Cabinet Occupational Safety and Health Program Division of Education and Training. The Construction Manager shall designate a responsible member of the on-site work force as the safety officer and shall report to the Consultant and to the Owner the name of the person selected. The duties of the safety officer include the enforcement of safety regulations.

ARTICLE 15 - HAZARDOUS MATERIALS

15.1 If the Construction Manager encounters material reasonably believed to be or suspected to be asbestos containing material, lead, polychlorinated biphenyls (PCBs), fluorescent light bulbs and ballasts, mercury or other hazardous material, the following procedures must be followed:

15.1.1 The Construction Manager shall immediately stop work in the affected area and notify the Owner's Project Manager. The Owner’s Project Manager will contact the Owner's Environmental Health and Safety unit to arrange for collection of samples, review of existing data, or other testing necessary to confirm the presence of hazardous materials. The Owner’s Project Manager will notify the Construction Manager in writing of the results. Until that notification is received, the Work must not continue in the affected area.

15.1.2 If the material is confirmed to be asbestos, lead, polychlorinated biphenyls (PCBs), fluorescent light bulbs and ballasts, mercury or other hazardous material, the Owner will take appropriate action to remove the material before the Construction Manager can continue Work in the affected area.

15.1.3 The Construction Manager shall not be required to perform any Work related to asbestos, lead, polychlorinated biphenyls, or other hazardous material. The Construction Manager is advised that certain classes of building materials (thermal system insulation, sprayed or troweled surfacing materials, and resilient flooring) installed before 1981 are required by law to be treated as asbestos containing until proven otherwise. These presumed asbestos containing materials must not be disturbed without confirmation from the Owner that asbestos is not present.

15.2 The Owner, the Construction Manager, and Sub-contractors will be under the requirements of the OSHA Hazard Communication Standard (29) CFR 1910.1200. The Construction Manager and Sub-contractors must provide their own written Hazard Communication Program. The Hazard Communication Standard must include: (1) A list of the hazardous chemicals to which the Construction Manager's employees may be exposed; (2) Statement of the measures that Construction Manager's employees and Sub-contractors may take to lessen the possibility of exposure to the

hazardous materials; (3) The location of and access to the Material Safety Data Sheets (MSDS's) related to the hazardous chemicals located in the Work area; (4) Procedures that the Construction Manager's employees and Sub-contractors are to follow if they are exposed to hazardous chemicals above the Permissible Exposure Limit (PEL). Material Safety Data Sheets may be reviewed upon request by the Construction Manager or any Sub-contractor as they pertain to the Work areas of the Project. Photocopies of the MSDS's may be made by Construction Manager at its expense.

15.3 The Construction Manager and Sub-contractors shall provide the Owner with a list of any hazardous materials that will be used on the job site. The Construction Manager and Sub-contractors shall provide the Owner with copies of Material Data Sheets for all such materials to be used.

15.4 It is the policy of the Owner that PCB containing equipment will be treated by the Construction Manager and the Owner in a manner that conforms to the intent of all applicable laws and regulations (primarily 40 CFR Part 761). The following procedures shall be followed by the Construction Manager and Sub-contractors while present on the Owner's Project or other property: (1) Only authorized, trained personnel may inspect, repair, or maintain PCB transformers; and (2) No combustible materials may be stored within a PCB transformer room or within five meters of a PCB transformer. Such materials include, but are not limited to, paints, solvents, plastic, paper, and wood. The Construction Manager shall not use rooms containing PCB transformers for storage rooms, staging areas, job site offices or break rooms. Violation of this policy may be grounds for dismissal of the offending Construction Manager and/or Sub-contractor from the Project. All PCB transformers at the University of Kentucky are identified by a PCB label as defined in federal regulations. If the Construction Manager should have a question as to the location of a PCB transformer, it should contact the Owner's Project Manager.

15.5 The Construction Manager shall ensure that NO asbestos-containing materials (including but not limited to: drywall, joint compound, roof mastic or floor tile adhesive) will be install on any University project without prior written approval of the University’s Environmental Health and Safety Division. Additionally, the Construction Manager shall submit MSDS sheets and have prior approval before installing any materials that contains hazardous substances or could pose an environmental hazard. If any environmental hazardous materials are installed without written approval of the University, the Construction Manager will be responsible for all material replacement cost, all removal and all other associated damages. Any materials removed shall be taken out in accordance with all applicable federal, state and local regulations.

ARTICLE 16 - INSPECTION OF WORK

16.1 Inspections, tests, measurements or other acts of the Consultant are for the sole purpose of assisting the Consultant in determining if the Work, materials, rate of progress, and quantities comply with the Contract Documents. These acts or functions shall not relieve the Construction Manager from performing the Work in full compliance with the Contract Documents, nor relieve the Construction Manager from any of the responsibility for the Work assigned to it by the Contract Documents. No inspection by the Consultant shall constitute or imply acceptance. Approval of material is general and shall not constitute waiver of the Owner's right to demand full compliance with Contract Documents.

16.2 All Work completed and all materials incorporated for the Project are subject to inspection by the Owner, the Consultant or their representatives to determine conformance with the Contract Documents. The Owner, Consultant and their representatives shall at all times have access to the Work whenever it is in preparation or progress. The Construction Manager shall provide, at no additional cost to the Owner, any facilities necessary for sufficient and safe access to the Work to complete any inspections required. The Consultant shall be given timely notification in order to

arrange for the proper inspections to be performed on any Work outside of the normal working day or week. If the Consultant provides the Construction Manager with a list of construction milestones that require inspection, the Construction Manager shall provide the Consultant with at least five (5) Business Days written notice prior to the commencement of Work with respect to such milestone in order to permit the Consultant time to coordinate an inspection of the commencement of the applicable Work.

16.2.1 Normal Work hours are defined as a period between 7:00 a.m. and 5:00 p.m. Monday through Friday. The Construction Manager shall notify the Owner's Project Manager at least one working day prior to performance of any Work for permission to do any Work during non-normal Work hours.

16.3 If the Specifications, the Consultant's instructions, laws, ordinances, or any public authority require any Work to be specially inspected, tested or approved, the Construction Manager shall give the Consultant timely notice of the readiness of the Work for inspection. The Consultant shall promptly make all required inspections. If any portion of the Work should be covered contrary to the request of the Consultant, or to the requirements specifically expressed in the Contract Documents, the Work must be uncovered for inspection and observation and shall be uncovered and replaced at the Construction Manager's expense.

16.4 If any other portion of the Work has been covered, which the Consultant has not specifically requested to observe prior to being covered, the Consultant, with the Owner's approval, may request to see such Work and it shall be uncovered by the Construction Manager. If such Work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall be charged to the Owner by appropriate Change Order. If such uncovered Work is not in accordance with the Contract Documents, the Construction Manager shall pay all costs for uncovering and replacement of such Work.

ARTICLE 17 - SUPERINTENDENT - SUPERVISION

17.1 The Construction Manager shall completely and thoroughly direct and superintend the Work in accordance with the highest standard of care for the Construction Manager's profession so as to ensure expeditious, workmanlike performance in accordance with requirements of the Contract Documents. Except as otherwise dictated by specific requirements of the Contract Documents, the Construction Manager shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures. The Construction Manager shall be responsible for the acts and omissions of all Sub-contractors and persons directly or indirectly employed by the Construction Manager in the completion of the Work. The Construction Manager shall be responsible for coordinating and scheduling all portions of the Work unless the Contract Documents give other specific instructions. The Construction Manager shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by the activities of the Consultant in the administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Construction Manager.

17.2 The Construction Manager shall have a competent superintendent on the Project site at all times during the process of the Work. The superintendent shall have authority to act on the Construction Manager's behalf with regard to all aspects of performance of this Contract. The superintendent shall have such assistants with individual specialized competencies as may be necessary to fully understand and oversee all aspects of the Work. The Construction Manager shall also provide administrative, supervisory and coordinating personnel required to fully perform the Work and for interfacing the Work with other work of the Project. The superintendent and all assistants shall be physically fit for their work and capable of going to all locations where Work is being performed. A communication given to the superintendent shall be binding on the Construction

Manager. Immediately after the award of Contract, the Construction Manager shall submit to the Consultant a list of Construction Manager's employees and consultants, including names, positions held, addresses, telephone numbers and emergency contact numbers.

17.3 The superintendent assigned shall not be changed except under the following circumstances: (1) Where the superintendent ceases to be employed by the Construction Manager, in which case the Construction Manager shall give timely written notice to the Owner of the impending change of the superintendent and a reasonable explanation for the change; or (2) Where the Owner or the Consultant have reasonable grounds for dissatisfaction with the performance of the superintendent and give written notice to the Construction Manager of the grounds. In either case, the Construction Manager shall obtain prior written approval from the Owner of the qualifications of the proposed replacement superintendent. Such prior approval will not be unreasonably withheld.

17.4 If the Owner or Consultant determines that the superintendent is not performing, or is incompetent to perform the required Work, the Owner may direct the Construction Manager to remove the superintendent from the Project and replace the superintendent with an employee who has the necessary expertise and skills to satisfactorily perform the Work.

ARTICLE 18 - CHANGES IN THE WORK

18.1 The Owner, at any time after execution of the Contract, may make changes within the general scope of the Contract or issue additional instructions, require additional Work, or direct the deletion of Work. The Owner's right to make changes shall not invalidate the Contract or relieve the Construction Manager of any obligations under the Contract Documents. All such changes to the Work shall be authorized in writing by Change Order and shall be executed under the conditions of the Contract Document. Any adjustment of the Contract Amount or Time of Completion, as may be appropriate, shall be made only at the time of ordering such change. Change order proposals based on a reservation of rights, whether for additional compensation to be determined at a later date or for an extension of time to be determined at a later date, will not be considered for approval and shall be returned to the Construction Manager without action.

18.2 The cost or credit resulting from a change in Work shall be determined in one or more of the following ways:

18.2.1 By unit prices named in the Contract or additional unit prices subsequently agreed upon;

18.2.2 By agreement on a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

18.2.3 By an amount agreed upon by the Construction Manager and the Owner as a mutually acceptable fixed or percentage fee.

18.3 All lump sum proposals shall include a detailed cost breakdown satisfactory to the Consultant and to the Owner for each component of Work indicating both labor and material costs. This cost breakdown shall be submitted to the Consultant promptly and with a goal of seven (7) Calendar Days or less after receipt of the proposal request.

18.3.1 In computing labor costs, the hourly labor rates shall not exceed a mutually agreeable combined hourly labor rate plus fringe benefits negotiated with the Owner based on a presentation of acceptable documentation by the CM. For the purposes of this Article, the term “fringe benefits” shall mean those funds transferred irrevocably to a third party for payment/distribution. In addition,

there may be added by the Sub-contractor an amount agreed upon, but not to exceed ten percent (10%) of the actual cost, for overhead and profit.

18.3.2 The CM is entitled to a mark-up for bonds and insurance on all change orders. For change orders coded "End User Requested Changes" or "Other Owner Requested Changes" the CM may add overhead & profit in addition to the bonds and insurance referenced above. The mark-ups shall not exceed the combined percentage for overhead and profit, bonds, and insurance stated in the CM's "Financial Proposal Summary". These mark-ups will not be added to the individual change orders but will be reconciled by amendment at the completion of the project and/or on an annual basis for those projects exceeding 12 months in duration.

18.4 If none of the above methods are mutually agreed upon or if the Construction Manager does not respond promptly, a change may be made by unilateral determination by the Owner and/or the Consultant of reasonable costs or savings attributable to the change, including a reasonable allowance for overhead and profit. If this method is utilized, the Construction Manager shall promptly proceed with the Work involved in the change upon receipt of a written order signed by the Owner. In such case, the Construction Manager shall keep and present an itemized accounting of labor, equipment, material and other costs, in such form as may be prescribed by the Consultant.

18.5 In all cases where Change Orders are determined by unit prices set forth in the Contract Documents, no amount is to be added for additional overhead and profit.

18.6 The Construction Manager shall keep and present in such form as the Consultant may direct, a correct account of all items comprising the net cost of such Work, together with vouchers. The determination of the Consultant and/or the Owner shall be final upon all questions of the amount and cost of extra Work and changes in the Work, and it shall include in such cost, the cost to the Construction Manager of all materials used, the cost of all labor (including social security, old age and unemployment insurance, fringe benefits to which the employee is entitled, and Workers Compensation insurance), and the fair rental of all machinery used upon the extra Work, for the period of such use, which was upon the Work before or which shall be otherwise required by or used upon the Work before or after the extra Work is done. If the extra Work requires the use of machinery not already on the Project site, or to be otherwise used upon the Work, then the cost of transportation of such machinery to and from the Project site shall be added to the fair rental value. Transportation costs shall not be allowable for distances exceeding one hundred (100) miles.

18.7 The Construction Manager shall not include or allow to be included in the cost of change in the Work any cost or rental of small tools, or any portion of the time of the Construction Manager or the superintendent, or any allowance for the use of capital, or for the cost of insurance or bond premium or any actual or anticipated profit, or job or office overhead. These items are considered as being covered under the added amount for general overhead addressed in Article 18.3

18.8 The Owner will not pay claims made for lost opportunities, claims made for lost production or production inefficiencies or claims made that are formula based.

18.9 Pending final determination of value, partial payments on account of changes in the Work may be made on recommendation of the Consultant. All Change Orders shall be in full payment and final settlement of all claims for direct, indirect and consequential costs, including all items covered and affected. Any such claim not presented by the Construction Manager for inclusion in the Change Order shall be waived.

18.10 The Consultant may authorize minor changes in the Work which do not involve additional cost or extension of the Contract Time, and which are not inconsistent with the intent of the Contract

Documents. Such changes shall be made by an ASI issued by the Consultant, and shall be binding on the Owner and the Construction Manager. The Construction Manager shall carry out such orders promptly. If the Construction Manager should claim that an ASI involves additional cost or delay to the completion of the Work, the Construction Manager shall give the Consultant written notice thereof within ten (10) Calendar Days after receipt of the written ASI. If this notification does not occur, the Construction Manager shall be deemed to have waived any right to claim or adjustment to the contract sum or to the contract completion time.

18.10.1 If the Construction Manager claims that any instructions by the Consultant involve additional cost or time extension, the Construction Manager shall give the Consultant written notice thereof within ten (10) Calendar Days after the receipt of such instructions and before proceeding to execute the change in Work. The written notice shall state the date, circumstances, whether a time extension will be requested, and the source of the order that the Construction Manager regards as a Change Order. Unless the Construction Manager acts in accordance with this procedure, any oral order shall not be treated as a change and the Construction Manager hereby waives any claim for an increase of the Contract amount or extension of the contract time.

18.11 Requests for extension of time related to changes in the Work shall be submitted in accordance with the requirements of Article 21 of these General Conditions.

18.12 Prior to final payment, the Construction Manager shall provide to the Owner a full accounting of executed change orders by and between the Construction Manager and the Trade Contracts. The Construction Manager shall also provide a reconciliation of that accounting against the executed change orders by and between the Owner and the Construction Manager.

ARTICLE 19 - RULES AND MEASUREMENTS FOR EXCAVATION

19.1 If applicable, the following Rules and Measurements shall apply to the use of Unit Prices for the excavation portion of the Work:

19.1.1 Except as provided in this Article 19 for arbitrary measurements, the quantity of excavation shall be its in-place volume before removal.

19.1.2 No allowance will be made for excavating additional material of any nature taken out for the convenience of the Construction Manager beyond the quantity computed under these "Rules and Measurements."

19.1.3 The quantities of excavation shall be computed from instrument readings taken by the Consultant’s representative in vertical cross sections located at such intervals that will assure accuracy.

19.1.4 "Trench Excavation" for pipes shall arbitrarily be assumed to be two feet (2') wider than the outside diameter of the pipe barrel and with sides vertical.

19.1.5 The quantities shall be computed from plan size, or if there are no drawings, from actual measurements of the Work in place.

19.1.6 Each unit price shall cover, among other things, engineering (surveying) costs and keeping excavating dry.

19.1.7 Earth excavation for structures will be measured between the vertical planes passing 18 inches beyond the outside of the footings and from the surface of the ground to the neat lines of the bottom of the structure.

19.1.8 Rock excavation for structures will be measured between the vertical planes passing 18 inches beyond the outside of the footings and from the surfaces of the rock to the neat lines of the bottoms of the structures or the actual elevation of the rock ledge.

19.1.9 Rock excavation for pipelines trenches, unless otherwise provided for in the Specifications, shall be measured as follows: An arbitrary width of 18 inches plus the nominal diameter of the pipe multiplied by the depth from the surface the rock to six (6) inches below the invert for pipe 24 inches in diameter or less and eight (8) inches below the invert for all pipe greater than 24 inches in diameter. No additional compensation will be allowed for excavation for bell holes, gates or other purposes. The measurement of rock excavation for manholes shall be in accordance with Section 19.1.8 above.

19.1.10 Unclassified excavation shall be measured in the same manner as earth excavation.

ARTICLE 20 - CONCEALED CONDITIONS

20.1 The Contract Drawings show the approximate location of the existing and new utility lines. These lines have been identified and located as accurately as possible using available information. The Construction Manager is responsible for verifying all actual locations. If utilities require relocation or rerouting that is not shown or indicated to be relocated or rerouted, the Construction Manager shall contact and cooperate with the Consultant to make the required adjustments. Any request for change in the Contract Amount by the Construction Manager shall be made pursuant to Article 18 of the General Conditions.

20.2 If any charted or uncharted utility service is interrupted by activities of the Construction Manager or the Construction Manager's Sub-contractor(s) for any reason, the Construction Manager shall work continuously to restore service to the satisfaction of the Owner.

20.2.1 If any charted utility service, or any uncharted utility service the existence of which could have been discovered by careful examination and investigation of the site of the Work by the Construction Manager, is interrupted by activities of the Construction Manager or the Construction Manager's Sub-contractor(s) for any reason, the entire cost to restore service to the satisfaction of the Owner shall be paid by the Construction Manager. Should the Construction Manager fail to proceed with appropriate repairs in an expedient manner, the Owner reserves the right to have the work/repairs completed and the cost of such work/repairs deducted from the monies due or to become due to the Construction Manager pursuant to Article 22 of the General Conditions.

20.3 The Construction Manager shall promptly, but in no case more than ten (10) Calendar Days from the time of discovery, and before the conditions are disturbed, notify Consultant in writing of:

20.3.1 Subsurface or latent physical conditions or any condition encountered at the site which differ materially from those indicated in the Contract Documents and which were not known by Construction Manager or could not have been discovered by careful examination and investigation of the site of the proposed Work;

20.3.2 Unknown and unexpected physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered in the locale or generally recognized as inherent in the Work provided for in this Contract or,

20.3.3 Concealed or unknown conditions in an existing structure which are at variance with the conditions indicated by the Contract Documents, which are of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in this Contract, and which were not known by the Construction Manager and could not have been discovered by careful examination and investigation of the site of the Work.

20.4 The Consultant shall promptly investigate the conditions discovered. If the Consultant finds that conditions, which are materially different from those ordinarily encountered and generally recognized as inherent in the Work provided for in this Contract, were not known by the Construction Manager, and could not have been discovered by careful examination and investigation of the site of the Work, have caused or would cause a material increase or decrease in the Construction Manager's cost of construction or the time required for performance of any part of the Work under this contract, the Consultant will recommend and the Owner will make an equitable adjustment in the Contract Amount and/or the time allotted for performance in the Contract Documents. Failure by the Construction Manager to provide written notice to the Owner of such claims for additional compensation or time for performance within ten (10) Calendar Days of discovery of such conditions shall constitute a waiver by the Construction Manager of the right to make such claims. The Owner will not pay claims made for lost opportunities, claims made for lost production or production inefficiencies or claims made that are formula based.

20.5 If the Consultant determines that changed conditions do not exist or are not materially different and no adjustment in the Contract Amount or time is warranted, the Construction Manager shall continue performance of the Contract as directed by the Consultant. No claim by the Construction Manager under this clause shall be allowed unless the required written notice is given and the Consultant is given adequate opportunity to investigate the conditions encountered prior to disturbance. The failure of the Construction Manager to give the Consultant proper notice of a differing site condition shall not affect the Owner's right to an equitable adjustment of the contract price or time if there is a decrease in the Contract Amount or time required to perform the Work.

ARTICLE 21 - DELAYS AND EXTENSION OF TIME

21.1 It is agreed that time is of essence for each and every portion of this Contract and where additional time is allowed for the completion of the Work or any part of the Work under this Contract, the new time limit fixed by such time extension shall be of the essence of this Contract. An extension of time shall not be cause for extra compensation under this Contract, except as set forth in Article 21.10 below.

21.2 The Construction Manager will, subject to the provisions of Articles 21.7, 21.8 and 21.9 below, be granted an extension of time and/or relief from liquidated damages when the delay in completion of the Work is due to:

21.2.1 Any preference, priority, or allocation order duly issued by the government;

21.2.2 Unforeseeable causes beyond the control and without the fault or negligence of the Construction Manager including, but not limited to, acts of God, or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, floods, epidemics, quarantine restrictions, strikes, and freight embargoes.

21.2.2.1For such delays which stop all work on the Project for thirty (30) Calendar Days or more, the Construction Manager shall be authorized at its discretion to remove its people from the site and return when the normal progress of the work may continue.

21.2.3 Regardless of the cause of a delay, the Construction Manager shall expend all reasonable effort to mitigate the impact of any delay.

21.2.4 Requests for additional time due to delays in transportation or due to failures of suppliers shall not be considered for approval.

21.3 Requests for extensions of time and/or relief from liquidated damages, except for weather related claims, shall be made in writing not later than ten (10) Calendar Days after the beginning of the delay. Requests for extension of time or relief from liquidated damages shall be stated in numbers of whole Calendar Days.

21.4 Except as otherwise provided in the Contract Documents, extensions of the contractually required completion dates may be granted for unusually bad weather on the Project. Unusually bad weather as used herein means daily temperature or precipitation that exceeds the normal weather recorded and expected for the locality and/or the season or seasons of the year. For the purposes of this contract, it is mutually agreed that the following chart accurately defines the number of days in each month on which bad weather can reasonably be anticipated to impact weather dependent construction operations, and the Construction Manager shall anticipate this normal seasonal weather in the development of the Project baseline schedule.

Mean Number of Days When	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max Temp 32° or Below	9	6	1	0	0	0	0	0	0	0	1	5
Precip. Is 0.10 Inch or Greater	7	6	9	7	8	8	8	6	5	5	7	7

For the purpose of this Contract, “unusually bad weather” shall be interpreted as either 1) those days in a given month on which rainfall was 0.10 inch or more that exceed the number of days shown in the row for “Precip” or 2) those days in a given month on which maximum temperature was 32 degrees F or below that exceed the number of days shown in the row for “Max Temp”, whichever is greater.

21.4.1 Requests for extension of time due to unusually bad weather that could not reasonably have been anticipated at the time of execution of the Contract shall be made in writing not later than the tenth calendar day of the month following the month in which the delay occurred.

21.4.2 Requests for an extension of time due to unusually bad weather shall be considered for approval only if it is shown that a) the unusual weather event delayed work on a specific weather dependent activity or activities that had been planned to be underway on the date(s) on which the weather event occurred, as shown in the most recent update to the Project schedule that had been submitted to the Owner prior to the date of the event, and b) only if the delay to that activity or activities is shown to be the proximate cause of a corresponding delay to the contractually required completion dates for the Project shown in the most recent update to the Project schedule. The actual dates on which the delay(s) occurred must be stated and the specific activities that were directly impacted must be identified. In the event of concurrent delays, only those activities actually

impacting contractually required completion dates will be considered in evaluating the merit of a delay request. Time extensions will not be considered if such adjustments do not exceed the total or remaining "float" associated with the impacted activities at the time of delay as shown in the most recent update to the Project schedule, nor for concurrent delays not caused by the Owner.

21.4.3 In anticipation of the possibility of delay due to unusually bad weather, the Construction Manager shall identify those activities in the baseline schedules, and those activities subsequently added to updated schedules, that might reasonably be expected to be delayed by such weather.

21.4.4 Delays caused by unusually bad weather shall be incorporated in the Project schedule when the schedule is next updated by showing actual dates and/or percent complete for those activities that were impacted by the unusually bad weather as well as the effects of any effort to mitigate such delays. When claims are submitted for time extensions resulting from more than one occurrence of unusually bad weather during a month, the Project schedule shall be updated to reflect such separate events sequentially so that the impact of each subsequent occurrence is shown on an adjusted Project schedule that includes all prior claims for additional time.

21.5 In addition to the requirements of Article 21.7 and Article 21.8 below, any request for an extension of time for strikes or lockouts shall be supported by a written statement of facts concerning the strike including, but not limited to, the dates, the craft(s) affected, the reason for the strike, efforts to resolve the dispute, and efforts to minimize the impact of the strike on the Project.

21.6 Approval of time extensions for changes in the Work will depend upon the extent, if any, to which the changes cause delay in the completion of the various elements of construction. The Change Order granting the time extension may provide that the Contract Time will be extended only for those specific elements so delayed and that other Work will not be altered.

21.7 The Contract Time will only be adjusted for causes specified above. Extensions of time will only be approved if the Construction Manager provides justification supported by the Project schedule or other acceptable data that 1) such changes are, in fact, on the critical path and extend the contractually required completion dates, and 2) the Construction Manager has expended all reasonable effort to minimize the impact of such changes on the construction schedule. No additional extension of time will be granted subsequently for claims having the basis in previously approved extensions of time.

21.8 In support of requests for an extension of time not caused by unusual inclement weather, and concurrently with the submittal of any such request, the Construction Manager shall submit to the Consultant and the Owner a written impact analysis showing the influence of each such event on contractually required completion dates as shown in the updated Project schedule most recently submitted to the Owner prior to the event. The analysis shall include a partial network diagram showing a sequence of new or revised activities and/or durations that are proposed to be added to the existing schedule including related logic (a "fragnet"). This impact analysis and the fragnet shall include the new activities and/or activity revisions proposed to be added to the existing schedule and shall demonstrate the claimed impact on the critical path and the contractually required completion dates. The Construction Manager will not be granted an extension of time and/or relief from liquidated damages when the delay to completion of the work is attributable to, within the control of, or due to the fault, negligence, acts, or omissions of the Construction Manager and/or the Construction Manager's contractors, subcontractors, suppliers, or their respective employees and agents. Time extensions will not be considered in the event such adjustments do not exceed the total or remaining "float" associated with the impacted activities at the time of delay, nor for concurrent delays not caused by the Owner. In the event of concurrent delays, only that event actually impacting contractually required completion dates will be considered in adjusting the schedule and evaluating the merit of a

delay claim. Requests for an extension of time which are not supported by this information shall not be considered for approval.

21.9 Approved extensions of time not caused by unusual inclement weather shall be incorporated in a revised schedule at the time of approval. No subsequent requests for time extension will be considered unless all previous approved time extensions have been incorporated in the Project schedule on which the requests are based.

21.10 Except as provided for in Article 21.10.1 through 21.10.3 below, no payment or compensation shall be made to the Construction Manager and extensions of the time fixed for completion of the Contract shall be the Construction Manager's sole remedy for any and all delays, hindrances, obstructions or impacts in the orderly progress of the Work.

21.10.1 In addition to the provisions of Articles 18.3 and 18.3.1 above, and subject to the requirements of Article 21.8 and 21.8.1 above, if the Owner orders changes to the scope of Work for the Project that extend the then current contractually required completion dates of the Project, the Construction Manager shall be entitled to reimbursement for job site, general conditions and staffing costs associated with such delay.

21.10.2 If delays, hindrances, impacts or obstructions of the Construction Manager's performance of the Contract are in whole or in part within the control of the Owner and, subject to the requirements of Article 21.8 and 21.8.1, extend contractually required completion dates of the Project, the Construction Manager shall be entitled to reimbursement for job site, general conditions and staffing costs for that portion of the costs caused by acts or omissions of the Owner.

21.10.3 Such reimbursements shall not include consequential or similar damages, exemplary damages, damages based on unjust enrichment theory, formula based delay claims, or any element of home office overhead.

ARTICLE 22 - CORRECTION OF WORK BEFORE FINAL PAYMENT

22.1 The Construction Manager shall promptly remove from the site and replace any material and/or correct any Work found by the Consultant to be defective or that fails to conform to the requirements of the Contract, whether incorporated in the Work or not, and whether observed before or after Substantial or Final Completion. The Construction Manager shall bear all costs of removing, replacing or correcting such Work or material including the cost of additional professional services necessary, and the cost of repairing or replacing all Work of separate contractors damaged by such removal or replacement.

22.2 The Consultant will notify the Construction Manager and the Owner immediately upon its knowledge that additional services will be necessary. The Owner may consent to accept such nonconforming Work and materials with an appropriate adjustment in the Contract Amount. Otherwise, the Construction Manager shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. If the Construction Manager fails to commence and continue to correct non-conforming Work within a reasonable time as determined by the Consultant, the Owner may without limitation of other rights available to the Owner and without prejudice to other remedies, take any necessary action to make the necessary corrections. If the Owner makes required corrections for non conforming Work or materials, a Change Order will be issued reflecting an equitable deduction from the Contract Amount. This amount will be deducted from payments due to the Construction Manager or, if no additional

payments are due, Construction Manager or the Construction Manager's surety shall be responsible for payment of this amount.

ARTICLE 23 - CORRECTION OF WORK AFTER FINAL PAYMENT

23.1 Neither the final certificate of payment nor any provisions in the Contract Documents shall relieve the Construction Manager of responsibility for materials and equipment incorporated into the Work that fails to meet specification requirements, or for the use of faulty materials or poor quality workmanship. If within one year after the date of Substantial Completion of the Work or designated portion thereof, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, the Construction Manager shall correct it promptly after receipt of written notice from the Owner to do so. The Construction Manager shall correct any defects due to these conditions and pay for any damage to other Work resulting from their use. Nothing contained in this clause shall be construed to establish a period of limitation with respect to any obligation of the Construction Manager under the Contract including, but not limited to, warranties. The obligation of the Construction Manager under this section shall be in addition to and not in limitation of any obligations imposed by special guarantees or warranties required by the Contract, given by the Construction Manager, or otherwise recognized or prescribed by law.

23.2 In addition to being responsible for correcting the Work and removing any non-conforming Work or materials from the job site, the Construction Manager shall bear all other costs of bringing the affected Work into compliance with the Contract requirements. This includes costs of any required additional testing and inspection services, Consultant's services, and any resulting damages to other property or to work of other contractors or of the Owner.

23.3 If the Construction Manager fails to correct nonconforming Work within a reasonable time as determined by the Consultant, the Owner may take necessary actions to make the necessary corrections. If the Owner makes required corrections for nonconforming Work or materials after Final Payment to the Construction Manager, the Owner shall be entitled to recover all amounts for such corrections, including costs and attorney's fees, from Construction Manager or surety.

ARTICLE 24 - TERMINATION OF CONTRACT FOR CONVENIENCE OF OWNER

24.1 The Owner, by written notice to the Construction Manager, may terminate this Contract in whole or in part when it is in the interest of the Owner, at the sole discretion of the Owner. In such case, the Construction Manager shall be paid for all Work in place and a reasonable allowance for profit and overhead on Work done, provided that such payments shall not exceed the total Contract price as reduced by the value of the Work as yet not completed. The Construction Manager shall not be entitled to profit and overhead on Work not performed.

ARTICLE 25- OWNER'S RIGHT TO STOP WORK

25.1 If the Construction Manager fails to correct defective Work as required, or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner by written notice may order the Construction Manager to stop the Work or any portion of the Work until the cause for the order has been eliminated to the satisfaction of the Owner. The Consultant may stop Work without written notice for 24 hours whenever in its professional opinion such action is necessary or advisable to insure conformity with the Contract Documents. The Construction Manager shall not be entitled to an adjustment in the Contract Time or Amount under this clause in the event such stoppages are determined to be the fault of the Construction Manager or its Sub-contractor(s). The right of the Owner or Consultant to stop Work shall not give rise to a duty on the part of the Owner or Consultant to exercise this right for the benefit of the Construction Manager or others.

ARTICLE 26 -TERMINATION OF CONTRACT FOR DEFAULT ACTION OF CONSTRUCTION MANAGER

26.1 In addition to its rights under Articles 24 and 25, the Owner may terminate the contract upon the occurrence of any one or more of the following events:

26.1.1 If the Construction Manager refuses or fails to prosecute the Work (or any separable part thereof) with such diligence as will insure its completion within the agreed upon time; or if the Construction Manager fails to complete the Work within such time;

26.1.2 If the Construction Manager is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the Construction Manager or a third party files a petition to take advantage of any debtor's act or to reorganize under the bankruptcy or similar laws concerning the Construction Manager, or if a trustee or receiver is appointed for the Construction Manager or for any of the Construction Manager's property on account of the Construction Manager's insolvency, and the Construction Manager or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract within ten (10) days of receipt of a request for assurance from the Owner;

26.1.3 If the Construction Manager repeatedly fails to supply sufficient qualified supervision of the work, or repeatedly fails to ensure that Sub-contractors supply adequate supervision, suitable materials or equipment, or adequate numbers of skilled workmen and supervision to the Work;

26.1.4 If the Construction Manager repeatedly fails to make prompt payments to Sub-contractors or suppliers at any tier, or for labor, materials or equipment;

26.1.5 If the Construction Manager disregards laws, ordinances, rules, codes, regulations, orders or similar requirements of any public entity having jurisdiction;

26.1.6 If the Construction Manager disregards the authority of the Consultant or the Owner;

26.1.7 If the Construction Manager performs Work which deviates from the Contract Documents, and neglects or refuses to correct rejected Work; or

26.1.8 If the Construction Manager otherwise violates in any material way any provisions or requirements of the Contract Documents.

26.2 Once the Owner determines that sufficient cause exists to justify the action, the Owner may terminate the Contract without prejudice to any other right or remedy the Owner may have, after giving the Construction Manager and its Surety three (3) Calendar Days notice by issuing a written Declaration of Default. The Owner shall have the sole discretion to permit the Construction Manager to remedy the cause for the contemplated termination without waiving the Owner's right to terminate the Contract.

26.3 In the event that the Contract is terminated, the Owner may demand that the Construction Manager's Surety take over and complete the Work on the Contract. The Owner may require that in so doing, the Construction Manager's Surety not utilize the Construction Manager in performing the Work. Upon the failure or refusal of the Construction Manager's Surety to take over and begin completion of the Work within twenty (20) Calendar Days after the demand, the Owner may take over the Work and prosecute it to completion as provided below.

26.3.1 In the event that the Contract is terminated and the Construction Manager's Surety fails or refuses to complete the Work, the Owner may take over the Work and prosecute it to completion in accordance with the laws of the Commonwealth, by contract or otherwise, and may exclude the Construction Manager from the site. The Owner may take possession of the Work and of all of the Construction Manager's tools, appliances, construction equipment, machinery, materials, and plant which may be on the site of the Work, and use the same to the full extent they could be used by the Construction Manager, without liability to the Construction Manager. At the Owner's sole discretion, the Owner has the right to take assignment of any or all portions of the contract work in order to prosecute the completion of the Work. In exercising the Owner's right to prosecute the completion of the Work, the Owner may also take possession of all materials and equipment stored at the site or for which the Owner has paid the Construction Manager but which are stored elsewhere, and finish the Work as the Owner deems expedient. In such case, the Construction Manager shall not be entitled to receive any further payment until the Work is finished.

26.3.2 If the unpaid balance of the Contract Price exceeds the direct and indirect costs and expenses of completing the Work including compensation for additional professional and Consultant services, such excess shall be used to pay the Construction Manager for the cost of the Work it performed and a reasonable allowance for overhead and profit. If such costs exceed the unpaid balance, the Construction Manager or the Construction Manager's Surety shall pay the difference to the Owner. In exercising the Owner's right to prosecute the completion of the Work, the Owner shall have the right to exercise its sole discretion as to the manner, methods, and reasonableness of the costs of completing the Work and the Owner shall not be required to obtain the lowest figure for Work performed in completing the Contract. In the event that the Owner takes bids for remedial Work or completion of the Project, the Construction Manager shall not be eligible for the award of such Contract.

26.3.3 The Construction Manager shall be liable for any damage to the Owner resulting from the termination or the Construction Manager's refusal or failure to complete the Work, and for all costs necessary for repair and completion of the Project above the amount of the Contract. The Construction Manager shall be liable for all attorney's fees, costs and expenses incurred by the Owner to enforce the provisions of the Contract.

26.3.4 If liquidated damages are provided in the Contract and the Owner terminates the Contract, the Construction Manager shall be liable for such liquidated damages, as provided for in Article 29.2 and 29.3 below, until Substantial Completion and Final Completion of the Work are achieved.

26.3.5 In the event the Contract is terminated, the termination shall not affect any rights of the Owner against the Construction Manager. The rights and remedies of the Owner under this Article are in addition to any other rights and remedies provided by law or under this Contract. Any retention or payment of monies to the Construction Manager by the Owner will not release the Construction Manager from liability.

26.3.6 In the event the Contract is terminated under this Article, and it is determined for any reason that the Construction Manager was not in default under the provisions of this Article, the termination shall be deemed a Termination for Convenience of the Owner pursuant to Article 24 and the rights and obligations of the parties shall be determined in accordance with Article 24.

ARTICLE 27 - SUSPENSION OF WORK

27.1 The Owner or the Consultant may, at any time and without cause, order the Construction Manager in writing or cause the Construction Manager to suspend, delay or interrupt all or any part of the Work for such period of time as the Owner may determine to be appropriate for its convenience.

Adjustment may be made for any increase in the Contract time necessarily caused by such suspension or delay, in accordance with Article 21.

ARTICLE 28 - TIME OF COMPLETION

28.1 The Construction Manager shall begin the Work on the date of commencement as specified in the Work Order. All time limits stated in the Contract Documents are of the essence of the Contract. The actual end of the Contract Time shall be the date specified on the approved certificate of Substantial Completion. The time for completion set forth in the Contract is a binding part of the Contract upon which the Owner may rely in planning the use of the facilities to be constructed and for all other purposes.

28.2 Substantial Completion is defined in Article 1.1.17 of these General Conditions. Only incidental corrective Work under punch lists and final cleaning (if required) for Owner's full use shall remain for Final Completion. The ability to occupy or utilize shall include regulatory authority approval unless regulatory approval is delayed due to actions of the Owner or the Consultant. When the Owner accepts and occupies a portion of the Project, the operation, maintenance, utilities, and insurance of that portion of the Project becomes the responsibility of the Owner.

28.3 The date of Substantial Completion shall be that date certified by the Owner, in accordance with the following procedures, that the Work is sufficiently complete to occupy or utilize as defined above.

28.3.1 When the Construction Manager considers the entire Work is substantially complete as defined in Article 1.1.17 of these General Conditions, and is ready for its intended use, the Construction Manager shall notify the Consultant in writing and request an inspection. The declaration and request shall be accompanied by a list prepared by the Construction Manager of those items of Work still to be completed or corrected. The failure of the Construction Manager or Consultant to include any item or items which are not completed or which need correction on such list shall not alter the responsibility of the Construction Manager to complete all Work in accordance with the Contract Documents.

28.3.2 The Consultant shall, within a reasonable time after receipt of notification from the Construction Manager of a declaration of Substantial Completion and request for inspection, make such inspection. Prior to the Substantial Completion Inspection and within sufficient time to allow the Consultant's review, the Construction Manager shall submit all As-Built drawings, Notice of Termination, catalog data, complete operating and maintenance instructions, manufacturer specifications, certificates, warranties, written guarantees and related documents required by the contract. The Consultant shall review said documents for accuracy and compliance with the Contract Documents and incorporate them into complete operating instructions and deliver them to the Owner.

28.3.3 If the Consultant considers the Work substantially complete, the Consultant shall recommend that the Owner prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion and the responsibilities between the Owner and Construction Manager for security, maintenance, heat, utilities and insurance, if not otherwise provided for in the Contract Documents, and a tentative list of items to be completed or corrected, and shall fix the time within which the Construction Manager shall complete the items listed therein. This time shall not exceed thirty (30) Calendar Days unless otherwise provided for in the Work Order. The Certificate of Substantial Completion shall be submitted to the Consultant and Construction Manager for their written acceptance of the responsibilities assigned to them in the certificate. The Project shall not be deemed substantially complete until the certificate is issued. If, after making the inspection, the

Consultant does not consider the Work substantially complete, the Consultant will notify the Owner and the Construction Manager in writing

28.4 Operation and Maintenance Manual Deliverables. In anticipation and preparation of completion of the Work and the closing out of the Project, and to facilitate training of the Owner's personnel in the maintenance and operation of the new installations, the Construction Manager shall comply with the requirements of Article 8.7 of the Special Conditions. (For the purposes of this article, air test and balance reports may be submitted at a later date with the request for certification of substantial completion.) These manuals shall be submitted to the Consultant for approval, and subsequently forwarded to the Owner's Project Manager by or before the time construction is 75% complete, as reflected by the Contractor's most recently submitted Application for Payment.

28.4.1 The provisions of Article 30.11 notwithstanding, if the Construction Manager meets the requirements of Article 28.4 above with respect to timely submittal of approvable Operation and Maintenance manuals and provided the project construction is 1) at least 75% complete and 2) is equal to or ahead of the approved progress schedule and 3) the Work completed is in compliance with the requirements of the contract documents, the Owner, at the sole discretion of the Director, Capital Projects Management Division may reduce the retainage to not less than three percent (5%) of the current Contract Amount. In the event the Construction Manager fails to submit acceptable O&M manuals prior to reaching 75% completion, it is agreed that the Owner at its sole discretion may deduct from the current and subsequent Applications for Payment an amount deemed by the Owner to be sufficient to encourage prompt compliance with this contractual requirement, until such time as acceptable O&M manuals are received.

28.5 Project Close Out. When the Construction Manager considers that all Work required by the Contract is 100% complete, including correction of any remaining punch list work or deficiencies, the Construction Manager shall notify the Consultant in writing and request a final inspection. The Consultant, upon receipt of written notice from the Construction Manager that the Work is complete and is ready for final inspection and acceptance, will promptly make such inspection and if the Consultant finds the Work completed and acceptable under the Contract Documents and the Contract fully performed, the Consultant will notify the Construction Manager in writing to submit, and will certify to the Owner a final Certificate for Payment in accordance with Articles 30.9 and 30.9.1 of these General Conditions. If the Construction Manager does not complete the punch items within the time designated, the Owner retains the right to have these items corrected at the expense of the Construction Manager including all architectural, engineering and inspection costs and expenses incurred by the Consultant and the Owner, and to deduct such costs and expenses from the funds being held in retainage. The Owner shall not be required to release the retainage until such items have been completed.

ARTICLE 29 - LIQUIDATED DAMAGES

29.1 The Owner and the Construction Manager recognize and agree that time is of the essence of this Contract and that the Owner will suffer financial loss if the Work is not completed within the time specified in the Contract plus any extensions that may be allowed. The parties further recognize the delays, expense and difficulties involved in proving the actual loss suffered by the Owner should the Work not be completed on time. The Owner and the Construction Manager agree on the amounts stated as liquidated damages in the Agreement. The Owner and Construction Manager agree that the amount stated as liquidated damages are not intended to be penalties.

29.2 Should the Construction Manager fail to satisfactorily complete the Work under Contract on or before the date stipulated for Substantial Completion, as adjusted by approved Change Orders, if any, the Construction Manager will be required to pay liquidated damages to the Owner for each

consecutive Calendar Day that the Owner is deprived of full use of the area beyond the date specified unless otherwise stipulated elsewhere by Owner. After the date for Substantial Completion has been certified by the Owner, the Construction Manager shall cease to owe liquidated damages until the date established for Final Completion.

29.3 If Final Completion is not achieved by the date established for Final Completion, as adjusted by approved Change Orders, if any, liquidated damages in the amount stipulated in the Agreement will become due and collectable. The Contract will be considered complete and Final Completion shall be deemed to have occurred when all Work has been completed in compliance with the Contract Documents and the Certificate of Final Completion has been issued by the Owner. No deduction or payment of liquidated damages will, in any degree, release the Construction Manager from further obligations and liabilities to complete the entire Contract. Permitting the Construction Manager to continue and finish the Work, or any part of it, after expiration of the Contract Time, shall in no way constitute a waiver on the part of the Owner of any liquidated damages due under the Contract.

ARTICLE 30 - PAYMENT TO THE CONSTRUCTION MANAGER

30.1 Payments on account of this Contract shall be made monthly as Work progresses. The Construction Manager shall submit to the Consultant, in the manner and form prescribed, an application for each payment, and, if required, receipts or other vouchers showing payments made for materials and labor, including payments to Sub-contractors. All payments shall be subject to any withholding or retainage provisions of this contract. All pay request documents, except the final payment, shall be submitted in whole dollar amounts. All payment applications from the Construction Manager shall include line items for overhead, profit and general condition costs.

30.2 The Consultant shall, within ten (10) Business Days after receipt of each application for payment, certify approval of payment in writing to the Owner and present the application to the Owner, or return the application to the Construction Manager indicating in writing its reasons for refusing to approve payment. The Owner, provided no exception is taken to the application for payment submitted by the Consultant, will issue payment on or within thirty (30) Business Days from the date received from the Consultant. A reasonable delay on the part of the Owner in making payment to the Construction Manager for any given payment shall not be grounds for breach of Contract. The Consultant may refuse to approve the whole or any part of any payment if it would be incorrect to make such presentation to the Owner.

30.3 If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at an off jobsite location agreed to in writing by the Owner that meets the manufacturer's requirements for the stored material and not-comingled with other material, the Construction Manager must furnish the following:

30.3.1 A list of the materials consigned to the Project (which shall be clearly identified), giving the place of storage, together with copies of invoices.

30.3.2 Certification that all items have been tagged for delivery to the Project and that they will not be used for any other purpose.

30.3.3 A letter from the Surety indicating that the Surety agrees to the arrangements and that payment to the Construction Manager shall not relieve either the Construction Manager or its Surety of their responsibility to complete the Work.

30.3.4 Evidence of adequate insurance listing the Owner as an additional insured covering the material in storage.

30.3.5 Evidence that representatives of the Consultant have visited the Construction Manager's place of storage and checked all items listed on the Construction Manager's certificate. They shall certify, insofar as possible, that the items are in agreement with the Specifications and approve their incorporation into the Project.

30.4 The Owner will pay 80% of the invoiced value less retainage for materials stored off site providing the above conditions are met.

30.5 The Construction Manager's signature on each subsequent application for payment shall certify that all previous progress payments received on account of the Work have been applied to discharge in full all of the Construction Manager's obligations reflected in prior applications for payment.

30.6 Each payment made to the Construction Manager shall be on account of the total amount payable to the Construction Manager and the Construction Manager warrants and guarantees that the title to all materials, equipment and Work covered by the paid partial payment shall become the sole property of Owner free and clear of all encumbrances. Nothing in this Article shall be construed as relieving Construction Manager from the sole responsibility for care and protection of materials, equipment and Work upon which payments have been made or restoration of any damaged Work or as a waiver of the right of Owner to require fulfillment of all terms of the Contract Documents.

30.7 Within thirty (30) Calendar Days of the award of any Trade Contracts, and prior to submitting the next application for payment, the Construction Manager shall submit to the Consultant and the Owner for approval a detailed breakdown of the Contract Amount including all trade contracts that have been awarded as of the date of that application for payment pursuant to CSI specification divisions, divided so as to facilitate payment and correlated to the schedule required by General Conditions Article 32 of the Contract Documents. The total value of all activities shall add up to the Contract Amount. When approved by the Consultant and the Owner, this schedule shall be used as a basis for Construction Manager's applications for payment and may be used by the Owner to determine costs or credits resulting from changes in the Work. Failure to obtain the approval of the Schedules of Values shall be a basis for withholding payment to the Construction Manager.

30.8 Retainage – The Owner will retain ten percent (10%) of the Construction Manager’s progress payments, including amounts claimed for construction management fee until fifty one percent (51%) of the construction project has been completed. Thereafter, if the Work is fully in compliance with the requirements of the Contract and except as provided for in Article 28.4.1 above, the Owner shall retain five percent (5%) of the total contract amount until Substantial Completion and acceptance of all Work covered by this Contract, as collateral security to insure successful completion of the Work. For the purposes of this Article, the term “in full compliance” shall mean 1) that the progress of the Work is equal to or ahead of that predicted by the Project Baseline schedule and 2) the Work completed is in compliance with the requirements of the contract documents. Subsequent to the issuance of the Substantial Completion Certificate and depending upon the cost involved for the completion and/or correction of punch list items, the Consultant may recommend to the Owner an adjustment to the amount being held as retainage and, if approved by Owner, the amount of retainage may then be reduced and a sufficient sum retained by Owner to assure completion of the remaining unfinished Work. Retainage reduction as provided for in this Article 30.8 is contingent upon the Construction Manager and/or Sub-contractors being on or ahead of the approved progress schedule and on verification by the Consultant that the Work completed is in compliance with the requirements of the contract documents.

30.8.1 In addition to the retainage set forth above, the Owner may withhold from any monthly progress payments or nullify any progress payments in whole or in part as necessary to protect the Owner from loss on account of:

30.8.1.1 Defective Work which has not been remedied or completed Work which has been damaged requiring correction or replacement, or

30.8.1.2 Action required by the Owner to correct Defective Work or complete Work which the Construction Manager has failed or refused to correct or complete, or

30.8.1.3 Failure of the Construction Manager to perform any of its obligations under the Contract, or

30.8.1.4 Failure of the Construction Manager to make payment properly to Sub-contractors; suppliers of material, services or labor; or to reimburse the University for utilities or other services as provided for in the Contract;

30.8.1.5 Amounts to be withheld as liquidated damages for failure to complete the Project in the allotted Contract time.

30.8.2 When the Owner is satisfied that the Construction Manager has remedied any such deficiency, payments shall be made of the amount being withheld on the next scheduled application for payment.

30.9 Final Payment – When all Work is completed and acceptable and the Contract is fully performed, the Construction Manager will be directed to submit a final payment application for certification and the entire balance shall be due and payable upon a certification of completion by the Consultant that the Work is in accordance with the Contract Documents. Final change order reconciliation as per Article 18.12 must be provided prior to final payment.

30.9.1 Upon issuance of the Certificate of Final Completion by the Owner and submittal by the Construction Manager of all required documents and releases, all retained amounts shall be paid to the Construction Manager as part of the Final Payment. By accepting such payment, the Construction Manager certifies that all amounts due or that may become due to any Sub-contractor, any Consultant of the Construction Manager, or any vendors or material suppliers, have been paid or will be paid from the proceeds of the final payment; and that, further, there are not liens, claims or disputes involving the Owner or the Consultant that are outstanding or unresolved.

30.10 The Construction Manager shall promptly pay each Sub-contractor and material supplier upon receipt of payment from the Owner the amount to which said Sub-contractor and supplier is entitled, reflecting the percentage actually retained from payments to the Construction Manager on account of such Sub-contractor's work. The Construction Manager shall, by an appropriate Agreement with each Sub-contractor and material supplier, require each Sub-contractor and supplier to make payments to their sub-contractors, vendors and suppliers in similar manner.

The Consultant may, on request, furnish to any Sub-contractor or material supplier information regarding the percentages of completion applied for by the Construction Manager and the action thereon by the Consultant.

30.10.2 Neither the Owner nor the Consultant shall have any obligation to make payment to any Sub-contractor or material supplier except as may otherwise be required by law.

ARTICLE 31 - AUDITS

31.1 The Construction Manager's Trade Contractors', sub-contractors' and/or vendor's "records" shall upon reasonable notice be open to inspection and subject to audit and/or reproduction during normal business working hours as may be deemed necessary by the Owner at its sole discretion. Such audits may be performed by an Owner's representative or an outside representative engaged by the Owner. The Owner or its designee may conduct such audits or inspections throughout the term of this contract and for a period of three years after final payment, or longer if required by law. Owner's representative may (without limitation) conduct verifications such as counting employees at the Construction Site, witnessing the distribution of payroll, verifying information and amounts through interviews and written confirmations with Construction Manager's employees, field and agency labor, Trade Contractors and vendors.

31.2 "Records" as referred to in this Contract shall include any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, superintendents' reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in the Owner's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Document. Such records shall include hard copy, as well as computer readable data if it can be made available, written policies and procedures; time sheets; payroll registers; cancelled payroll checks; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); back charge logs and supporting documentation; invoices and related payment documentation; general ledger; records detailing cash and trade discounts earned; insurance rebates and dividends; and any other Construction Manager or contractor records which may have a bearing on matters of interest to the Owner in connection with the Construction Manager's dealings with the Owner (all foregoing hereinafter referred to as the "records") to the extent necessary to adequately permit evaluation and verification of any or all of the following:

Compliance with Contract requirements for deliverables;
Compliance with approved plans and specifications;
Compliance with Owner's business ethics expectations;
Compliance with Contract provisions regarding the pricing of change orders;
Accuracy of Construction Manager representations regarding pricing of invoices; and
Accuracy of Construction Manager representations related to claims submitted by the Construction Manager or its payees.

31.3 The Construction Manager shall require all payees (examples of payees include Trade Contractors, Sub-contractors, vendors, and/or material suppliers) to comply with the provisions of this Article by including the requirements hereof in a written contract agreement between the Construction Manager and payees. Such requirements to include flow-down right of audit provisions in contracts with payees will also apply to Subcontractors and Sub-subcontractors, material suppliers, etc. The Construction Manager will cooperate fully and will cause all related parties and all of the Construction Manager's Trade Contractors and/or subcontractors (including those entering into lump sum subcontracts) to cooperate fully in furnishing or in making available to Owner from time to time whenever requested, in an expeditious manner, any and all such information, materials and data.

31.4 Owner's authorized representative or designee shall have reasonable access to the Construction Manager's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of this contract and shall provide adequate and appropriate work space in order to conduct audits in compliance with this Article. The Construction Manager and its payees agree bear their costs and expenses relating to any inspections and audits.

31.5 If an audit inspection or examination in accordance with this Article discovers any fraud or misrepresentation, or discloses overpricing or overcharges (of any nature) by the Construction Manager to the Owner, in addition to making adjustments for the overcharges, the reasonable actual cost of the Owner's audit shall be reimbursed to the Owner by the Construction Manager. Any adjustments and/or payments that must be made as a result of any such audit or inspection of the Construction Manager's invoices and/or records shall be made within Ninety (90) Calendar Days from presentation of the Owner's findings to the Construction Manager.

31.6 The provisions of Articles 31.1, 31.2 and 31.5 notwithstanding, the Owner shall have the right to conduct inspections and audits of any matter relating to the Contract Documents or the Work, which shall be for the Owner's sole benefit and shall not relieve the Construction manager, its sureties, contractors, subcontractors suppliers and their respective employees and agents of any obligations under the Contract Documents.

31.7 Any audits or inspections under Article 31 shall not constitute a waiver of any right the Owner has to accounting or discovery of records in the possession, custody or control of the Construction Manager, its sureties, contractors, subcontractors, vendors and their respective employees and agents

ARTICLE 32 - PROGRESS & SCHEDULING

32.1 If requested by the Owner during the Design Phase of the Project, and working in cooperation with the Owner and the Consultant(s), the Construction Manager shall prepare a Critical Path Method (CPM) type Design Phase schedule incorporating design phase and review activities through completion of the design and bidding of the Trade Contracts, shall include in this Design Phase schedule the broad categories of Work to be accomplished in the subsequent implementation of the design and construction of the Project, and shall modify and update this Design Phase schedule as necessary to reflect the actual status and then current plan for the Project.

32.2 The schedules submitted for this Project shall be prepared using Primavera P6 scheduling software. If approved by the University, and at the sole discretion of the University, schedules submitted using earlier versions of Primavera scheduling software (Primavera SureTrak or Primavera P3) may be converted to Primavera P6 format by the University for review purposes. However, the University will not be responsible for any inaccuracies that may result from such conversions.

32.2.1 Prior to bidding Trade Contracts, the Construction Manager shall prepare and submit to the Owner and the Consultant a preliminary CPM construction schedule for the Work that will be included in the Project bidding documents.

3.2.2.2 The schedules submitted for this Project shall coordinate Work in accordance with all schedules included in the Owner's approved Program. Construction work shall be scheduled and executed such that operations of the University are given first priority. This applies particularly to outages and restriction of access.

32.2.3 The schedules submitted for this Project shall not exceed time limits established for the Project. Schedules which reflect a duration less than the Contract Time are for the convenience of the Construction Manager and shall not be the basis of any claim for delay or extension of time.

32.2.4 Schedules shall be revised at appropriate intervals as required by the condition of the Work and the Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

32.2.5 The Construction Manager shall also submit a payment schedule indicating the percentage of the Contract Amount and the amount of the anticipated monthly payments that will be requested as the Project proceeds.

32.2.6 The Owner may withhold approval of all or a portion of progress payments until the progress payment schedule and construction schedule have been submitted by the Construction Manager.

32.3 The Construction Manager shall prepare and keep current, for the Consultant's approval, a separate schedule of submittals coordinated with the Construction Manager's CPM construction schedule that provides reasonable time for the Consultant to review the submittals.

32.4 The Construction Manager shall cause the work to be performed pursuant to the most recent schedules.

ARTICLE 33 - USE OF COMPLETED PORTIONS

33.1 Upon mutual Agreement between the Owner, Construction Manager, and Consultant, the Owner may use a completed portion of the Project after an inspection is made. Such possession and use shall not be deemed as acceptance of any Work not completed in accordance with the Contract Documents, nor shall such possession and use be considered to alter warranty obligations or cause any warranty period to commence prior to Substantial Completion.

ARTICLE 34 - INDEMNIFICATION

34.1 To the fullest extent permitted by law, the Construction Manager shall indemnify and hold harmless the Owner, its consultants, and their respective employees and agents from and against all claims, damages, losses and expenses, including attorney's fees, provided that any such claim, loss, damage or expense: (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (b) is caused in whole or in part by any negligent act or omission of the Construction Manager, any Sub-contractor or material supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable This basic obligation to indemnify shall not be construed to nullify or reduce other indemnification rights which the Owner, its consultants, and their respective employees and agents would otherwise have.

34.2 The Construction Manager shall also indemnify and hold harmless the Owner, its consultants, and their respective employees and agents from any claims relating to the Project brought against the Owner, its consultants, and their respective employees and agents by any Sub-contractor unless such claims are due to the gross negligence or misconduct of the Owner or Consultant.

34.3 In any and all claims against the Owner its consultants, and their respective employees and agents, by any employee of the Construction Manager, any Sub-contractor, any one directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Article shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Construction Manager or any Sub-contractor under Worker's Compensation acts, disability benefit acts or other employee benefit acts.

34.4 The obligations of the Construction Manager under this Article shall not extend to the liability of the Consultant, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the

giving of or the failure to give directions or instructions by the Consultant, his agents or employees, provided such giving or failure to give is the primary cause of injury or damage.

ARTICLE 35 - INSURANCE

35.1 The Construction Manager shall furnish the Owner the Certificates of Insurance or other acceptable evidence that insurance is effective, and guarantee the maintenance of such coverage during the term of the Contract. Each policy of insurance, except Workers Compensation, shall name the University of Kentucky and the directors, officers, trustees and employees of the University as additional insured on a primary and non-contributory basis as their interest appears. Waiver of subrogation in favor of the University of Kentucky shall apply to all policies. Any endorsements required to validate such waiver of subrogation shall be obtained by the Construction Manager at the Construction Manager's expense.

35.2 The Construction Manager shall not commence, nor allow any Sub-contractor to commence Work under this Contract, until the Owner has reviewed the certificates and approved coverages and limits as satisfying the requirements of the bidding process.

35.3 Workers' Compensation and Employers' Liability Insurance. The Construction Manager shall acquire and maintain Workers' Compensation insurance with Kentucky's statutory limits and Employers' Liability insurance as defined in the Special Conditions for all employees who will be working at the Project site. In the event any Work is sublet, the Construction Manager shall require any Sub-contractor to provide proof of this insurance for the Sub-contractors' employees, unless such employees are covered by insurance provided by the Construction Manager.

35.4. The Construction Manager shall either require each Sub-contractor to procure and maintain insurance of the type and limits stated during the terms of the Contract, or insure the activities of such Sub-contractors under a blanket form as described below:

35.4.1 Commercial General Liability Insurance. The Construction Manager shall acquire and maintain a Broad Form Comprehensive General Liability (CGL) Insurance Policy including premises - operations, products/completed operations, blanket contractual, broad form property damage, real property fire legal liability and personal injury liability coverage. The Insurance Policy must be on an "occurrence" form only, unless approved by the Owner. Contractual liability must be endorsed to include defense costs. Products and completed operations insurance must be carried for two years following completion of the Work. Policies which contain Absolute Pollution Exclusion endorsements are not acceptable. Coverage must include pollution from "hostile fires". Where required by the risks involved, Explosion, Collapse and Underground (XCU) coverages shall be added by endorsement. If the work involved requires the use of helicopters, a separate aviation liability policy as defined in the Special Conditions will be required. If cranes and rigging are involved, a separate inland marine policy with liability limits as defined in the Special Conditions will be required.

35.4.1.1 The limits of liability shall not be less than defined in the Special Conditions.

35.4.2 Comprehensive Automobile Liability Insurance. The Construction Manager shall show proof and guarantee the maintenance of insurance to cover all owned, hired, leased or non-owned vehicles used on the Project. Coverage shall be for all vehicles including off the road tractors, cranes and rigging equipment and include pollution liability from vehicle upset or overturn. Policy limits shall not be less than defined in the Special Conditions.

35.4.3 Excess or Umbrella Liability Insurance. The Construction Manager shall acquire and maintain a policy of excess liability insurance in an umbrella form for excess coverages over the required primary policies of broad form commercial general liability insurance, business automobile liability insurance and employers' liability insurance. This policy shall have a minimum as defined in the Special Conditions for each occurrence in excess of the applicable limits in the primary policies. The excess liability policy shall not contain an absolute pollution exclusion and shall include coverages for pollution that may occur due to hostile fires and vehicle upset and overturn. The limits shall be increased as appropriate to cover any anticipated special exposures.

35.5 Builders Risk Insurance. The Construction Manager shall purchase and maintain an "all risk" Builder's Risk Insurance policy upon the Work at the site to the full insurable value thereof. Such insurance shall include interests of the Owner, Construction Manager, and all Sub-contractors and of their subcontractors. It shall insure against perils of fire, extended coverage, vandalism and malicious mischief. Construction Manager's work performed, and materials to be incorporated into the project and stored on the jobsite, will be covered. Builder's Risk does not include temporary buildings, or Construction Manager or Construction Manager's tools, equipment, or trailers and contents.

35.6 Insurance Agent and Company Insurance as required in the bidding process of the Project shall be written according to applicable state law in Kentucky. The policies shall be written by an insurer duly authorized to do business in Kentucky in compliance with KRS: 304.1-.100 and -110.

ARTICLE 36 - PERFORMANCE AND PAYMENT BONDS

36.1 The Construction Manager shall furnish a Performance Bond in the form provided in the Contract Documents in the full amount of the Contract Amount as security for the faithful performance of the Contract. The Construction Manager shall also furnish a Payment Bond in the form provided in the Contract Documents in the full amount of the Contract Amount for the protection of all persons performing labor or furnishing materials, equipment or supplies for the Construction Manager or its Sub-contractors for the performance of the Work provided for in the Contract, including security for payment of all unemployment contributions which become due and payable under Kentucky Unemployment Insurance Law.

36.2 Each bond furnished by the Construction manager shall incorporate by reference the terms of the Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Amount is adjusted by Change Order, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amounts.

36.3 The performance and payment bonds shall be executed by a surety company authorized to do business in the Commonwealth of Kentucky, and the contract instrument of bonds must be countersigned by a duly appointed and licensed resident agent.

ARTICLE 37 - DAMAGED FACILITIES

37.1 The Construction Manager shall repair or replace, at no expense to the Owner, any damaged section of existing buildings, paving, landscaping, streets, drives, utilities, watersheds, etc. caused by Work performed under the Contract or incidental thereto, whether by the Construction Manager's own forces, Sub-contractors or by material suppliers. Such repair or replacement shall be performed by craftsmen skilled and experienced in the trade or craft for the original Work.

37.2 Water damage to the interior of any building caused by Work performed under the Contract or incidental thereto, whether by the Construction Manager's own forces, Sub-contractors, or by material suppliers, and whether occurring in a new or existing building, shall be repaired by the

Construction Manager at the Construction Manager's expense, and any materials damaged inside the building, including personal property, shall be repaired or replaced at the full replacement cost by the Construction Manager at the Construction Manager's expense.

37.3 For existing buildings, the Construction Manager, along with the Owner's Representative and Consultant, will tour the Project site to evaluate existing conditions and determine any existing damage before any Work on this Contract is done.

37.4 Should the Construction Manager fail to proceed with appropriate repairs in an expedient manner, the Owner reserves the right to have the Work/repairs completed and deduct the cost of such Work/repairs from amounts due or to become due to the Construction Manager. If the Owner deems it not expedient to repair the damaged Work, or if repairs are not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

ARTICLE 38 - CLAIMS & DISPUTE RESOLUTION

38.1 All Construction Manager's claims and disputes shall be referred to the Consultant for review and recommendation. All claims shall be made in writing to the Consultant and to the Owner's Project Manager not more than ten (10) days from the occurrence of the event which gives rise to the claim or dispute, or not more than ten (10) days from the date that the Construction Manager knew or should have known of the claim or dispute. Unless the claim is made in accordance with these requirements, it shall be waived. Any claim not submitted before Final Payment shall be waived. The Consultant shall render a written decision within fifteen (15) days following receipt of a written demand for the resolution of a claim or dispute.

38.1.1 The provisions of Article 43.2 notwithstanding, claims and disputes between the Construction Manager and any Sub-contractor or supplier shall not be referred to the Consultant except to request interpretation and/or clarification of the intent of the plans or specifications. Such claims and disputes between the Construction Manager and any Sub-contractor shall be resolved between those parties as required by Article 43.4 of these General Conditions.

38.2 The Consultant's decision shall be final and binding on the Construction Manager unless the Construction Manager submits to the Consultant and the Owner's Project Manager a written notice of appeal within fifteen (15) Calendar Days of the Consultant's decision. The Construction Manager must present within fifteen (15) Calendar Days of such notice to appeal a narrative claim in writing with complete supporting documentation. After receiving the written claim, the Project Manager will review the materials relating to the claim and may meet with the Consultant and/or the Construction Manager to discuss the merits of the claim. The Project Manager will render a decision within thirty (30) Calendar Days after receiving the written claim and supporting documentation. The decision of the Project Manager shall be final and binding pending further appeal as provided for in Article 39. If the Consultant or the Project Manager do not issue a written decision within thirty (30) calendar days after receiving the claim and supporting documentation, or within a longer period as may be established by the parties to the Contract in writing, then the Construction Manager may proceed as if an adverse decision had been received.

38.3 If the Project Manager does not agree with the Consultant's decision on a claim by the Construction Manager, the Project Manager shall notify the Construction Manager and the Consultant and direct the Construction Manager to perform the Work about which the claim was made and the Construction Manager shall proceed with such Work in accordance with the Project Manager's instruction. If the Construction Manager disagrees with a decision of the Project Manager concerning a Construction Manager's claim, the Construction Manager shall proceed with the Work as indicated by the Project Manager's decision.

38.4 The Construction Manager shall continue to diligently pursue Work under the Contract pending resolution of any dispute, and the Owner shall continue to pay for undisputed work in place.

ARTICLE 39 - CLAIMS FOR DAMAGE

39.1 Should either party to the Contract suffer damage because of wrongful act or neglect of the other party, or of anyone employed by them, or others for whose act they are legally liable, or if other controversy should arise under the Contract, such claim or controversy shall be made in writing to the other party within thirty (30) days after the first occurrence of the event. Prior to the institution of any action in court, the claim or controversy (together with supporting data) shall be presented in writing to the Director of the Capital Project Management Division at the University of Kentucky ("Director") or his designee. The Director, or designee, is authorized, subject to any limitations or conditions imposed by regulations, to settle, comprise, pay, or otherwise adjust the claim or controversy with the Construction Manager. The Director, or designee, shall promptly issue a decision in writing. A copy of the decision shall be mailed or otherwise furnished to the Construction Manager. The decision rendered shall be final and conclusive unless the Construction Manager files suit pursuant to KRS 45A.245. If the Director, or designee, does not issue a written decision within one hundred and twenty (120) days after written request for a final decision, or within a longer period as may be established by the parties to the Contract in writing, then the Construction Manager may proceed as if an adverse decision had been received.

39.2 Any legal action on the Contract shall be brought in the Franklin Circuit Court and shall be tried by the Court sitting without a jury. All defenses in law or equity, except the defense of government immunity, shall be preserved to the Owner. The Owner shall recover from the Construction Manager all attorney's fees, costs and expenses incurred to the extent the Owner prevails in defending or prosecuting each claim in litigation of disputes under the Contract. The Owner is the prevailing party under this provision and is entitled to recover attorneys' fees, costs and expenses on a claim-by-claim basis to the extent the Owner successfully defeats or prosecutes each claim. A recovery of a net judgment by the Construction Manager shall not be determinative of the Owner's right to recover attorneys' fees, expenses and costs. Rather, such a determination shall be made based on the extent that the Owner successfully defends or prosecutes each distinct claim in litigation under the Contract, even if the Owner does not prevail on every claim. The Construction Manager shall be liable to the Owner for all attorney's fees, costs and expenses incurred by the Owner to enforce the provisions of the Contract.

ARTICLE 40 - LIENS

40.1 The filing and perfection of liens for labor, materials, supplies, and rental equipment supplied on the Work are governed by KRS 376.195 et seq.

40.2 Statements of lien shall be filed with the Fayette County Clerk and any action to enforce the same must be instituted in the Fayette Circuit Court, pursuant to KRS 376.250 (5).

40.3 The lien shall attach only to any unpaid balance due the Construction Manager for the improvement from the time a copy of statement of lien, attested by the Fayette County Clerk, is delivered to the Owner, pursuant to the provisions of KRS 376.240.

ARTICLE 41 - ASSIGNMENT

41.1 Neither party to the Contract shall assign the Contract, or any portion thereof without the prior written consent of the other, which consent may be granted or withheld in the granting party's

sole and absolute discretion. The Construction Manager shall not assign any amount or part of the Contract or any of the funds to be received under the Contract unless the Construction Manager has the prior written approval of the Owner (which approval may be granted or withheld in the Owner's sole and absolute discretion) and the Surety on the Construction Manager's bond has given written consent to any such assignment.

ARTICLE 42 - SEPARATE CONTRACTS

42.1 The Owner reserves the right to enter into other Contracts in connection with the Project or to perform any work with the Owner's forces in the normal sequence of the work as depicted in the then current construction schedule. Except for work performed by University personnel, such contracts shall be assignable to the Construction Manager and shall contain the same terms and conditions as the contracts between the Construction Manager and the Sub-contractors. The Construction Manager will be entitled to a maximum of three percent (3%) overhead and profit on the value of such assigned contracts. The Construction Manager shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate its Work with theirs in such manner as the Consultant may direct.

42.2 Should the Construction Manager cause damage to any separate contractor on the Work, and the separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Construction Manager shall be responsible for all costs, attorney's fees and expenses incurred by the Owner for defending such proceedings unless the Owner prevails on behalf of the Construction Manager in which case fees and expenses will be the responsibility of the separate contractor and if any judgment against the Owner arises therefrom, the Construction Manager shall pay or satisfy it and shall pay all costs, attorney's fees and expenses incurred by the Owner.

42.3 If any part of the Construction Manager's Work depends upon the work of any other separate contractor, the Construction Manager shall promptly report to the Consultant any observed defects in such work that render it unsuitable for proper execution connection. The failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the work, except as to defects which may develop in the other contractor's work after the execution of the work.

42.4 Whenever work being done by the Owner's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various parties involved shall be established by the Owner to secure the completion of the various portions of the Work in general harmony.

ARTICLE 43 - CONSTRUCTION MANAGER/SUB-CONTRACTOR RELATIONSHIP

43.1 The Construction Manager is fully responsible to the Owner for the acts and omissions of the Sub-contractors and of persons either directly or indirectly employed by them. The Construction Manager is responsible for the acts and omissions of persons employed directly by the Construction Manager and for the coordination of the Work, including placement and fittings of the various component parts. No claims for extra costs as a result of the failure to coordinate the Work, or by acts or omissions of the various Sub-contractors, will be paid by the Owner.

43.2 Except as otherwise provided in these Contract Documents, the Construction Manager agrees to bind every Sub-contractor by the terms and conditions of the Contract Documents as far as applicable to their portion of the Work. Upon request, the Construction Manager shall provide copies of any subcontracts and purchase orders to the Owner or Consultant.

43.3 The Construction Manager shall make no substitution or change in any Sub-contractor listed and accepted by the Consultant or Owner except as approved in writing by the Owner. The Construction Manager shall not employ any Sub-contractor or supplier against whom the Owner or the Consultant has made reasonable and timely objection. The Construction Manager (CM) will not be allowed to self-perform work or bid on any of the proposed work categories unless a subcontractor fails to perform and upon prior approval by the Universities authorized representatives."

43.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Sub-contractor, Trade Contractor or Supplier, nor shall the Construction Manager include any language in their contracts with any Sub-contractor, Trade Contractor and/or Supplier that might Imply such a relationship. The Construction Manager is hereby notified that it is the Construction Manager's contractual obligation to settle disputes between Sub-contractors, Trade Contractors, and/or Suppliers. Neither the Owner nor the Consultant will settle disputes between the Construction Manager and any Sub-contractor, Trade Contractor, and/or Supplier or between Sub-contractors, Trade Contractors, and/or Suppliers.

43.4.1 The Owner does not waive sovereign immunity under KRS 45A.245(1) for any claim or claims made by parties not having a written contract with the University of Kentucky.

43.4.2 Third party and/or flow-through type claims, from Sub-contractors and/or suppliers or any other entity not having a written contract directly with the University, are specifically prohibited by this Contract and no provision of the Construction Manager's contracts with such entities shall indicate otherwise.

43.4.3 The Construction Manager shall indemnify and hold harmless the Owner and its agents and employees from any claims relating to the Project brought against the Owner by any of the Construction Manager's Sub-contractors or suppliers, or between their sub-contractors or suppliers.

ARTICLE 44 - CASH ALLOWANCE

44.1 The Construction Manager is to provide or require the Sub-contractor(s) to include in the Contract Amount all costs necessary to complete the Work. Costs based on "allowances" shall be permitted only for objectively quantifiable material items and only with the prior written approval of the Owner.

ARTICLE 45 - PROJECT SITE LIMITS

45.1 The Construction Manager shall confine the apparatus, the storage of materials, and the operations of Workmen to Project site limits indicated in the Contract Documents and as permitted by law, ordinances, and permits, and shall not unreasonably encumber the site with materials and equipment.

ARTICLE 46 - CLEAN UP

46.1 The Construction Manager shall at all times keep the premises free from accumulation of waste material or rubbish caused by the operations in connection with the Work. All corridors and exit doors must be kept clear at all times. All exit ways, walks, and drives must be kept free of debris, materials, tools and vehicles.

46.2 At the completion of the Work, and prior to final inspection and acceptance, the Construction Manager shall remove all remaining waste materials, rubbish, Construction Manager's construction equipment, tools, machinery, and surplus materials and shall leave the Work in a clean and usable

condition, satisfactory to the Consultant and the Owner. If the Construction Manager fails to clean up as provided in the Contract Documents, the Owner may perform the cleaning tasks and charge the cost to the Construction Manager.

ARTICLE 47 - POINTS OF REFERENCE

47.1 The Construction Manager shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction, the Construction Manager shall be charged with the resulting expense of replacement and shall be responsible for any mistake that may be caused by their loss or disturbance.

ARTICLE 48 - SUBSTITUTION - MATERIALS AND EQUIPMENT

48.1 Reference to or the listing of items to be incorporated in the construction without referring to any specific article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number shall be interpreted as establishing the general intent of the Contract and the general standard of quality for that item.

48.2 Specific references in the Contract Documents to any article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number, with the words "or equal", shall be interpreted as establishing a minimum standard of quality, and shall not be construed as limiting competition.

48.2.1 Substitution of other equipment and materials as “or equal” to items named in the specifications will be allowed provided the proposed substitution is approved by the Consultant and will perform the functions called for by the general design, be similar and of equal quality to that specified and be suited to the same use and capable of performing the same function of that specified. The Construction Manager has the burden to prove equality of any substitution requested.

48.3 Specific references in the Contract Documents to any article, device, equipment, product, material, fixture, patented process, form, method or type of construction, or by name, make, trade name, or catalog number, without the words “or equal”, shall be interpreted as defining an item or source that has after careful consideration been determined by the University as necessary to be compliant with, and/or to function properly within, the University operational system. No substitutions will be allowed.

48.3.1 In the event the Contract Documents contain specific reference to two or more items as described in Article 48.3, any of those listed will be acceptable.

48.4 Substitution of equipment and materials previously submitted by the Construction Manager and approved by the Consultant will be considered only for the following reasons:

48.4.1 Unavailability of the materials or equipment due to conditions beyond the control of the supplier.

48.4.2 Inability of the supplier to meet Contract Schedule.

48.4.3 Technical noncompliance to specifications.

48.5 In substituting materials or equipment, the Construction Manager assumes responsibility for any changes in systems or modifications required in adjacent or related work to accommodate such substitutions, despite consultant approval, and all costs associated with the substitution shall be the

responsibility of the Construction Manager. The Consultant shall be reimbursed by the Construction Manager for any architectural or engineering revisions required as the result of such substitutions.

48.6 Inclusion of a certain make or type of materials or equipment in the Construction Manager's bid proposal shall not obligate the Owner to accept such materials or equipment if they do not meet the requirements of the Contract Documents and any such substitutions in the preparation of the bid without written approval shall be at the sole risk of the Construction Manager.

ARTICLE 49 - TEST AND INSPECTION

49.1 Regulatory agencies of the government having jurisdiction may require any Work to be inspected, tested or approved. The Construction Manager shall assume full responsibility therefore, pay all costs in connection therewith, unless otherwise noted, and furnish the Consultant the required certificates of inspection, testing or approval.

49.2 The Construction Manager shall give the Consultant timely notice of readiness of the Work for all inspections, tests or approvals.

49.3 The technical specifications may indicate specific testing requirements to be performed by the Construction Manager. Unless otherwise provided in the Contract Documents, the cost of all such testing shall be the responsibility of the Construction Manager. Testing shall be completed using a testing facility or laboratory approved by the Owner.

49.4 The costs of all inspection fees as may be required to construct and occupy the Work shall be the responsibility of the Construction Manager.

ARTICLE 50 - WARRANTY

50.1 The Construction Manager warrants to the Owner and the Consultant that all materials and equipment furnished under this Contract shall be new and in accordance with the requirements of the Contract Documents, and that all Work shall be of good quality, free from faults and defects and in conformance with the Contract Documents. If required by the Consultant or the Owner, the Construction Manager shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If the Construction Manager requests approval of a substitution of material or equipment, the Construction Manager warrants that such installation, construction, material, or equipment will equally perform the function for which the original material or equipment was specified. The Construction Manager explicitly warrants the merchantability, the fitness for a particular purpose, and quality of all substituted items in addition to any warranty given by the manufacturer and/or supplier. Approval of any such substitution is understood to rely on such warrant of performance. Prior to the Substantial Completion inspection, the Construction Manager shall deliver to the Consultant all warranties and operating instructions required under the Contract or to which the Construction Manager is entitled from manufacturers, suppliers, and Sub-contractors. All warranties for products and materials incorporated into the Work shall begin on the date of Substantial Completion. The warranty provided in this Article 50 shall be in addition to and not a limitation of any other warranty or remedy required by law or by the Contract Documents, and such warranty shall be interpreted to require the Construction Manager to replace defective material and equipment and re-execute defective Work which is disclosed to the Construction Manager by or on behalf of the Owner within a period of one (1) year after Substantial Completion of the entire Work in addition to other warranty obligations beyond one year from Substantial Completion as provided for by law or by the Contract Documents.

50.2 Neither the final payment, any provision in the Contract Documents nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of Work not done in accordance with Contract Documents or relieve the Construction Manager or its Sureties of liability with respect to any warranties or responsibilities for faulty materials and workmanship. The Construction Manager or its sureties shall remedy any defects in Work and any resulting damage to Work at the Construction Manager's own expense. The Construction Manager shall be liable for correction of all damage resulting from defective Work. If the Construction Manager fails to remedy any defects or damage, the Owner may correct Work or repair damages and the cost and expense incurred in such event shall be paid by or be recoverable from the Construction Manager or the surety. The Owner will give notice of observed defects with reasonable promptness.

50.3 The Construction Manager shall guarantee that labor, material, and equipment will be free of defects for a period of one (1) year from the date shown on the Certificate of Substantial Completion unless special conditions or additional warranty periods are required by the contract pursuant to Article 23 in addition to warranty obligations which extend beyond one year from Substantial Completion. The Owner will give notice of observed defects with reasonable promptness. Expendable items and wear from ordinary use are excluded from this warranty.

50.4 Should the Construction Manager be required to perform tests that must be delayed due to climate conditions, it is understood that such tests will be accomplished by the Construction Manager at the earliest possible date with provisions of the general warranty beginning upon satisfactory completion of said test. The responsibility of the Construction Manager under this Article will not be abrogated if the Owner should elect to initiate final payment. If the Owner initiates final payment, consent of Construction Manager's surety acknowledging that Work not yet tested is required. The Construction Manager shall warrant that the entire Project will conform to the Contract Documents.

50.5 In addition to the foregoing, the Construction Manager shall warrant for a period of one (1) year that all buildings and other improvements constructed as a part of the Work shall be watertight and leak proof at every point and in every area. The Construction Manager shall, immediately upon notification by or on behalf of the Owner of water penetration, determine the source of water penetration and, at the Construction Manager's expense, (a) do any work necessary to make such buildings or improvements watertight and (b) repair and replace any other damaged material, finishes and furnishings damaged as a result of such water penetration and return the buildings or other improvements to their original condition.

50.6 The Construction Manager shall address and resolve to the Owner's satisfaction any warranty claims made by or on behalf of the Owner during the above described warranty period and all repairs and replacements made by the Construction Manager pursuant to this Article 50 shall be warranted by the Construction Manager, on the terms set forth in this Article 50, for a period of time commencing upon the completion of such repairs and replacements and ending on the later of (a) the expiration of the one (1) year warranty period provided for above or (b) six (6) months after the date such repair or replacement is completed.

50.7 All costs, attorney's fees and expenses incurred by the Owner as a result of the Construction Manager's failure to honor any warranty for the Work shall be paid by or recoverable from the Construction Manager.

ARTICLE 51 - PREVAILING WAGE LAW REQUIREMENTS (NO LONGER USED AS OF 1/9/17)

ARTICLE 52 - APPRENTICES

52.1 Apprentices (for all classifications of work) shall be permitted to work only under an apprenticeship agreement approved by the Kentucky Supervisor of Apprenticeship and by the Kentucky Apprenticeship and Training, United States Department of Labor.

ARTICLE 53 - GOVERNING LAW

53.1 This Contract and all issues and disputes arising out of this Contract shall be governed by, construed and enforced in accordance with the laws of the Commonwealth of Kentucky without consideration of its conflicts of laws principles.

ARTICLE 54 - NONDISCRIMINATION IN EMPLOYMENT

54.1 During the performance of the Contract, the Construction Manager agrees as follows:

54.1.1 The Construction Manager will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, national origin, or disability in employment. The Construction Manager will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, age, national origin, or disability in employment. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Construction Manager agrees to post in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

54.1.2 The Construction Manager will, in all solicitations or advertisements for employees placed by or on behalf of the Construction Manager; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age, national origin or disability in employment.

54.1.3 The Construction Manager will send to each labor union or representatives of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representatives of the Construction Manager's commitments under this Article, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

54.2 Failure to comply with the above nondiscrimination clause constitutes a material breach of Contract.

ARTICLE 55 - AFFIRMATIVE ACTION; REPORTING REQUIREMENTS

55.1 The Construction Manager and any Sub-contractor is exempt from any affirmative action or reporting requirements, under the Kentucky Equal Employment Opportunity Act of 1978, KRS 45.550 to KRS 45.640 “The Act", if any of the following conditions are applicable:

55.1.1 The Trade Contract awarded is in the amount of two hundred and fifty thousand dollars ($250,000.00) or less, and the amount of the Trade Contract is not a subterfuge to avoid compliance with the provisions of the Act;

55.1.2 The Construction Manager or Sub-contractor utilizes the services of fewer than eight (8) employees during the course of the Contract;

55.1.3 The Construction Manager or Sub-contractor employs only family members or relatives;

55.1.4 The Construction Manager or Sub-contractor employs only persons having a direct ownership interest in the business and such interest is not a subterfuge to avoid compliance with the provisions of The Act.

55.2 The Construction Manager and any Sub-contractor, not otherwise exempted, shall:

55.2.1 For the length of the Contract, hire DBE's from within the drawing area to satisfy the agreed upon goals and timetables. Should the union with which the General Contractor or Sub-contractor have collective bargaining agreements be unwilling to provide sufficient DBE's to satisfy the agreed upon goals and timetables, the General Contractor and Sub-contractors shall hire DBE's from other sources within the drawing area.

Diverse Business Enterprises (DBE) consist of minority, women, disabled, veteran and disabled veteran owned business firms that are at least fifty-one percent owned and operated by an individual(s) of the aforementioned categories. Also included in this category are disabled business enterprises and non-profit work centers for the blind and severely disabled. MBE, WBE, Veterans, Disabled Veterans and Disabled make up Diverse Business Enterprises (DBE)

55.2.2 The equal employment provisions of The Act may be met in part by the Construction Manager contracting to a DBE contractor or Sub-contractor. A DBE contractor, or Sub-contractor shall mean a business established under the definition of a DBE in Article 55.2.1

55.2.3 The Construction Manager shall, for the length of the Contract, furnish such information as required by The Act and by such rules, regulations and orders issued pursuant thereto and will permit access by the contracting agency and the department to all books and records pertaining to its employment practices and Work sites for purposes of investigation to ascertain compliance with The Act and such rules, regulations and orders issued pursuant thereto.

55.3 If the Construction Manager is found to have committed an unlawful practice against a provision of The Act during the course of performing under this Contract, a Trade Contract or a subcontract covered under The Act, the Owner may cancel or terminate the Contract, conditioned upon a program for future compliance approved by the Owner. The Owner may also declare such Construction Manager ineligible to submit proposals on further contracts until such time as the Construction Manager complies in full with the requirements of The Act.

55.4 Any provisions of The Act notwithstanding, the Construction Manager shall not be required to terminate an existing employee, upon proof that employee was employed prior to the date of the Contract, nor to hire anyone who fails to demonstrate the minimum skills required to perform a particular job.

END OF DOCUMENT

General Scope for All Contractors

The following Contract Documents (i.e. attachments) shall be applicable to this Subcontract Agreement:

Exhibit A -	Drawing Log
Exhibit B1 -	Special Conditions for All Contractors & Vendors
Exhibit C -	Insurance
Exhibit D -	Safety Handbook
Exhibit F.2 -	Example PO
Exhibit N -	Logistics Plan
Exhibit O -	Tobacco Free Policy
Exhibit P -	Utility Damage Prevention

Scope of Subcontractor's Work shall include, but not necessarily be limited to the following:

1. SAFETY AND INSURANCE REQUIREMENTS

i. Pepper Construction Company's (PCCO) Safety Handbook procedures have been reviewed and all necessary provisions are included. Along with many other things, this includes hard hats, safety glasses, and high vis must be supplied to all Subcontractor's personnel (including 2nd tier subs) and worn at all times.

ii. This Contractor will promote safety awareness on the jobsite.

iii. Fire extinguishers are to be provided and kept within appropriate distance of workspace. Extinguishers are to be inspected and maintained.

iv. Job Site Specific Safety Plan to be submitted and reviewed with Pepper Construction prior to mobilization. Field Supervisors are required to attend this meeting. Work may not begin without this meeting being complete.

v. Provide a copy of your company's Safety Plan to Pepper Construction's Superintendent. This will be kept in the job site office for the duration of your trade's work.

vi. Provide prior to starting any work, MSDS sheets for all material used on the job. This Contractor will maintain a current log at the job site, including a copy for PCCI's Superintendent.

vii. The use of cut resistant gloves is required at all times for trades with exposure to hand and finger cut hazards. Trades include, but are not limited to: electrical, mechanical, sheet metal, plumbing, carpentry, drywall, concrete and demolition.

viii. Safety: Each tradesperson must attend a safety orientation, approx. 15-20 min on the jobsite before they may start work on the project site.

ix. Safety Railing – If this Subcontractor needs to remove any safety railings to perform his work, the Subcontractor shall remove and replace the safety railings at no additional expense to Pepper Construction. During the time that the safety railing is removed, the Subcontractor shall be responsible for performing the work in this area per all applicable OSHA standards and provide necessary signage, barricades and/or caution tape to warn other personnel. After the work is complete, the Subcontractor shall immediately reinstall the safety railing to meet OSHA and/or jobsite standards.

x. Prior to the start of the Work, Subcontractor is to furnish their Certificate of Insurance, in accordance with Pepper Construction requirements. Should the Subcontractor's insurance

requirements not be sufficient, the Subcontractor shall secure additional insurance to meet Pepper Construction minimums at no additional cost.

2. GENERAL ITEMS

i. Each contractor has the responsibility to immediately examine the contract documents for errors, inconsistencies or omissions. Any such errors, inconsistencies or omissions shall immediately be brought to the attention of Pepper Construction.

ii. Full time supervision is included for this scope of work for any and all shifts of work required to complete the provided Pepper schedule. This includes supervision for this Subcontractor's second-tier subcontractors.

iii. All clean up associated with this scope of work to a dumpster provided by the General Trades Contractor on ***a daily basis*** is included.

iv. All layout associated with this scope of work has been considered and is included. Primary Control point's or bench marks to be established by the General Trades Contractor.

v. All required sleeves, cores, box outs, and saw cutting will be indicated on shop drawings for Structural Engineer's review prior to placement or cutting.

vi. All required concrete penetrations shall include concrete scanning which shall be submitted to the structural engineer in shop drawing form prior to coring.

vii. Identify all second tier subcontractors. Lien waivers to be provided for each payment request.

viii. Daily Reports – The Subcontractor shall submit a daily report to the onsite Pepper Superintendent. The report shall list the number of workers onsite, equipment onsite, and shall give appropriate details of work completed and milestones reached.

ix. For materials store off site please refer to the University of KY Standards for billing requirements.

x. Each subcontractor shall provide a weekly report that will include a brief summary of work, procurement log, weekly photos, and change order log in a Microsoft editable document. The summary of work can be bullets or a paragraph indicating clearly work completed in each area or zone of work, and 4 weeks look ahead, and to include photos. A template document can be provided to the subcontractor and available at each progress meeting for review. The procurement log shall include each fixture, equipment, materials, product, etc., submitted date, submittal required by date, order placed date, make, model, serial number. lead time, and on site delivery date. A template document can be provided to the subcontractor and available at each progress meeting for review. The change order log shall include Change Order Number, change order title, description of the change order, and reason for change order (i.e. RFI, drawing omission, field directive, etc.) The change order log shall also list potential change orders as well as pending change orders. Unsubmitted Change Order requests shall have a rough order of magnitude listed. A template document can be provided to the subcontractor and available at each progress meeting for review. All the job RFI's, submittals, and meeting minutes will be provided through PCC's project management software.

xi. Subcontractor Licensing: Subcontractor or vendor shall obtain and/or possess the Subcontractor Licensing Requirements as dictated by all Local Entities.

xii. Subcontractor Permits: Pepper Construction or Owner are responsible for the General Building Permit only.

A. Subcontractor is responsible to complete all the necessary drawings, permit application forms etc. related to this Trades scope of work (such as fire alarm, fire protection, earth retention system, etc.) as required by the Authority having Jurisdiction.

xiii. Subcontractor shall furnish and install all materials that meet or exceed the requirements of the Authority having Jurisdiction.

xiv. As-builts – Maintain accurate as-built drawings throughout the life of the project.
(3) Hard Copies of all As-Builts and O&M are required to be promptly submitted to Pepper at the end of the project. These are to be submitted no later than (2) weeks after substantial completion.
O. This contractor shall submit a completed close out document containing all the documents required by the specifications and contract documents within 2 weeks of substantial completion.

xv. You will complete a labor rate sheet for the current year prior to a contract being awarded to your company.

xvi. Labor rate and material escalations have been considered and are included.

xvii. All large deliveries must be scheduled and coordinated with Pepper and the General Trades Contractor. Material deliveries SHALL be in accordance with the project schedule and project logistics.

xviii. This Contractor will pre-plan and coordinate using the project logistics plan, Deviation and disregard to the logistics plan, prior to consent from the Pepper Site Superintendent, will result in this Contractor being held responsible for repair and remediation to damaged areas.

xix. All Warranties are to be submitted per the specified durations starting on the date of substantial completion. Warranty period are not allowed to begin at the start of purchase, startup, delivery date, or anything other than the date of substantial completion.

xx. Plan for Multiple iterations of the punch list may be generated and distributed by CM, Design Team, and Owner. All punch list items are to be closed out within 5 workdays of receipt of punch list. More time will be granted if approved by Pepper Construction.

xxi. Material & equipment hoisting for your scope of work is included. Pepper will not be responsible for hoisting any of your materials or equipment.

xxii. All equipment operated on the building concrete slab-on-grade must be diapered to prevent oil spills. Tires are to be clean and white or covered.

xxiii. Pipe threading machines used anywhere on site shall have a diaper or other means of containment to prevent oil or other contaminants off of the floor or concrete.

xxiv. No indelible markers shall be used to write on the wall, slabs, or other building components.

xxv. Preceding work – The Subcontractor shall check and verify proper subgrade placement of the preceding work prior to installation of his work. Subcontractor shall notify Pepper superintendent of any issues with preceding work prior to installation of own work.

xxvi. Extra Work Authorization / Approval – additional payment for work outside the scope of this contract must have prior authorization from the Pepper project manager and/or superintendent. Upon completion of T&M work, a written material and labor breakdown, signed by the Pepper superintendent must be forwarded to the project manager within seven (7) calendar days.

xxvii. All contractors shall provide street cleaning where entering and exiting the job site where dirt, mud, and all other debris enters the roadway caused by or created by performing this contractors scope of work.

xxviii. Underground Utilities – This Subcontractor shall be responsible to locate and protect any underground utilities prior to the start of your excavation work, this includes all public or private utilities, off-site or on-site. Coordinate location of private utility locates with the Pepper Superintendent. Should

any utilities be damaged during work performed under this subcontract, the damage will be repaired or replaced, and the cost borne by this Subcontractor. Also refer to excludes.

xxix. Where testing is required for work installed under this contract, either by the technical specification sections or the local authority having jurisdiction, it will be provided by this Subcontractor. Re-testing due to improper Work or any special testing that is not normal and is for the specific benefit of the Subcontractor shall be at the Subcontractor's expense.

xxx. Sales Tax for material required for the contracted scope of work is included.

xxxi. **COVID 19**. Subcontractor is responsible to abide by all current CDC and Pepper Construction social distancing guidelines. If current 6' guidelines require a N95 mask or respirator it is the responsibility of this contractor to provide and distribute said mask to its applicable employees.

3. SCHEDULE REQUIREMENTS

i. Schedule: All costs required to maintain the construction schedule, (Exhibit E Construction Schedule) have been considered and are included. This Subcontractor shall guarantee the manpower to complete the project within the Construction Schedule.

ii. Schedule Compliance – Schedule is critical on this Project. Should the Subcontractor's schedule slip from the Project Schedule, the Subcontractor will be notified in writing, and within 24 hours will provide a recovery schedule acceptable to Pepper Construction. Should the Work not proceed in accordance with the accepted recovery schedule, Pepper Construction will have the right to take any actions necessary to ensure performance of the Work.

iii. Work Coordination – This Subcontractor shall coordinate his work with the work of other trades as necessary to promote a smooth and orderly flow of work and meet the required schedule.

iv. Subcontractor Schedule – Pepper Construction has developed a Master Project Schedule that is included as an exhibit to this contract. Within ten (10) days after award of this Contract, this Subcontractor shall submit a schedule which includes all major work items, milestones, and task dependencies, both inside and outside his Scope of Work.

v. Submittals: All submittals shall be provided within 10 business days from contract award or earlier if necessary, in order to have the material delivered in time to meet the construction schedule.

vi. Material Lead Times: If necessary to meet the requirements of the schedule, material shall be expedited, at this Subcontractor's cost. Contractors are to notify PCCO of materials with lead times that are anticipated to be longer than 10 business days.

vii. Overtime/weekends – The Subcontractor shall work overtime and/or weekends at no additional cost to Pepper Construction to make up for work days lost due to inclement weather. Saturday's Only.

viii. Weekly Subcontractor Progress Meetings – Subcontractor acknowledges the importance of onsite project meetings and communicating current project status, required subcontractor coordination with other trades, and the size of your workforce required to adhere to current project schedule. Subcontractor Progress Meetings will be held, on a weekly basis and the Subcontractor is required to have a supervisor attend the meetings.

4. Pull Planning and LEAN Requirements

A. Subcontractor understands that this project uses Lean Construction Principles including Pull Planning and has included all of the necessary time and resources required for full participation in all scheduling activities. Subcontractor understands that they will be responsible for the determination and accuracy of the information that they provide.

B. For each phase plan of the project (Insert mile stones for pull planning, by floor and finish) any sub with work in that area will be required to attend an initial phase plan meeting that should last approximately 1/2 day to set the schedule for that phase. This will be a detailed schedule for each phase. Each subcontractor shall come to each meeting with each task, task duration, crew size, and other pertinent information.
C. At each progress meeting the subcontractors the pull plan will be reviewed for progress of the past week and updates for the next 4 weeks to update the pull plan as needed. This will include a detail schedule for a moving 4 week window.
D. Each day, the lead on-site field employee will be required to attend a stand up in field meeting to reconfirm the day's activities with the other subs working in their phase.
E. Should a subcontractor's failure to achieve the dates agreed upon during the weekly meeting be a result of a subcontractor's own actions, that subcontractor will be responsible for payment of the necessary overtime and/or other expenses needed to account for the corresponding time delays. This will be either for actions required by them or by another subcontractor.
F. To assist in this effort, Pepper will maintain a Visual Site Plan that outlines the lay down area for each subcontractor during each week. Each subcontractor will be responsible for relocating their material as the Visual Site Plan is updated.

5. LOGISTIC REQUIREMENTS

i. Trash Removal: ***Daily*** trash removal from all construction areas, for the contracted scope of work, to a project-supplied dumpster has been included. Two warnings will be given this subcontractor. Should a third warning be issued, Pepper Construction will supplement a laborer to clean up materials/trash. This cost will be bourne back to this subcontractor.
ii. Manpower / Equipment: Subcontractors shall include all manpower and equipment necessary to receive & unload and stock materials required for the contracted scope of work. Pepper Construction will not accept deliveries on behalf of Subcontractors.
iii. On-Site Storage/Deliveries –Materials shall be delivered as-needed and coordinated with Pepper's Superintendent.
iv. Site Restrictions/Access – The Subcontractor shall confine his operations, equipment, and manpower to the site limits of this Project and/or as described by Pepper's Superintendent. All construction access to and from the site must use the designated access point(s). This Subcontractor will pre-plan accordingly and the team (Pepper and Subcontractors) will agree to a logistics plan and identify traffic patterns for access to work. Deviation and disregard to the agreed upon plan, prior to consent from the Pepper Superintendent, will result in this Subcontractor being held responsible for repair and remediation to damaged area(s).
v. Protection of work – This Subcontractor shall be fully responsible for restoration to the work of other trades damaged by his employees. Subcontractor shall be responsible for all costs associated with the repair or replacement of its own work and/or the work of others when the Subcontractor or any of its agents, employees, suppliers causes such damage.
vi. Flagmen: Subcontractor shall include the necessary flagmen and traffic control to facilitate the delivery, unloading, and removal of any items associated with this scope of work as deemed necessary by Pepper Construction Company or the Local Entities.
vii. Roads/Parking Lots – All vehicles must enter and exit at the construction entrance and take appropriate measures to keep mud and dirt off of the streets. If this contractor's vehicles track

mud onto the public streets, this subcontractor is responsible to clean it up immediately. Pepper Construction to provide stone access drive.
Staging: Staging of all equipment and materials must adhere to the Logistical Plan provided by and/or developed with Pepper Construction.

6. **Quality Requirements**
   A. **Trade Partner Quality Plan:** All Trade Partners awarded subcontract agreements are encouraged to prepare and submit a Job Specific Quality Plan (JSQP). The Trade Partner JSQP shall incorporate all facets of the construction process from design/engineering to closeout. Submit to Pepper prior to starting work. Regardless of the contractors completion and submission of a JSQP, all contractors are expected to perform their work to the highest industry standards.
   B. **Preinstallation Meeting:** Pepper will lead a mandatory preinstallation meeting with each "major" Trade Partner prior to starting work. The Trade Partner Project Manager and Foreman (on site) is required to attend this meeting. During this meeting, the team will review the scope of work, safety, schedule, logistics, key specification requirements, unique trade requirements, etc. Note that the preinstallation meeting is by scope, not necessarily trade partner (some trade partners will have multiple preinstallation meetings). Preinstallation meetings last approximately one hour depending on the complexity of the scope of work.
   C. **Quality Reviews and Reporting:** The Pepper jobsite staff conducts routine quality inspections to review work-in-place, first work, substrate, etc. for conformance with the plans, specifications, submittals, manufacturer's requirements, and industry standards. The project team will maintain a quality log tracking in real time the status of both conformance and non-conformance items identified during the inspection. Pepper's Project Team will review any non-conforming items with the project Foreman. Resolving issues quickly, before they are covered up, will be essential.
   D. **Defective Work:** If defects or deficiencies are discovered, Trade Partners are required to provide an initial assessment of the defects/deficiencies within two (2) days, and within seven (7) days Trade Partners shall implement a plan to correct the defects/deficiencies. Trade Partners shall provide photo documentation of the defect/deficiency repair to Pepper. Trade Partners that repeat issues or otherwise demonstrate a lack of expertise or understanding, will be required to participate in any training deemed necessary by Pepper's Director of Quality Management to bring the Trade Partner expertise to a level that will enable them to comply.
   E. Subcontractors shall verify the design documents and notify Pepper Construction and/or design team of inconsistencies as the drawings are schematic in nature, and it is the responsibility of the contractor to verify and coordinate a proper installation.
   F. Each MEP-FP subcontractor shall field verify and accurately coordinate the locations of the existing MEP-FP systems. All subcontractors must coordinate all remaining components within the coordinated footprint.
   G. Review and take action on Quality issues brought up by Pepper, Owner, Architect, and Engineer to comply with the contract documents and proper installation per industry standards or Manufacturers' recommendations. If the industry standard, manufacturer recommendation, or contract documents conflict this contract shall notify Pepper within 3 calendar days of the discovery of the conflict.

EXHIBIT C – Non-CCIP

Pepper Construction Company of Ohio, LLC
Supplier Insurance Requirements

PLEASE ISSUE A CERTIFICATE OF INSURANCE FOR THE PROJECT REFERENCED BELOW IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS. SUBMIT TO THE SAME ADDRESS AS SHOWN AS CERTIFICATE HOLDER. THANK YOU.

JOB DESCRIPTION:

Job Number:
Job Name:
Job Address:

ADDITIONAL INSUREDS TO BE LISTED: (Must be listed exactly as shown)

Pepper Construction Company of Ohio, LLC

Owner
Architect

CERTIFICATE HOLDER:

PEPPER CONSTRUCTION COMPANY OF OHIO, LLC
Attention:

EXPERIENCE MODIFICATION RATING (EMR):

PEPPER CONSTRUCTION COMPANY OF OHIO, LLC ("PEPPER") has a strong commitment to safety on our construction projects and it is important that our suppliers display that same commitment. Therefore, PEPPER requests that each supplier ("Supplier") instruct its insurance company to send PEPPER a letter indicating its Experience Modification Rating (EMR) for the last three (3) years.

Contractually, the Supplier is required to keep a valid Certificate of Insurance on file for a period of three (3) years from the date of Substantial Completion.

Any questions, please call

EXHIBIT C – Non-CCIP

Supplier shall maintain, at its own expense, during the procurement and delivery of materials or equipment on the jobsite and throughout the warranty period, insurance written by insurance companies acceptable to PEPPER (as further described below) with the minimum limits and coverage as shown below or, if higher, the requirements set forth in the Contract Documents. For purposes of this **Exhibit C – Non-CCIP**, suppliers providing materials for the following major trade classifications shall be referred to as "Major Trade Suppliers": Concrete/Pre-cast Concrete; Curtainwall; Electrical; Elevator; Excavation/Earthwork; Fire Protection; Hoisting/Tower Crane; HVAC; Plumbing/Piping; Shoring/Underpinning; Soil Stabilization; Special Foundations/Caissons; and Steel. To the fullest extent allowed under applicable law, Supplier shall comply with the following insurance requirements:

A. Unless otherwise required by the Contract Documents, at a minimum, Supplier's insurance shall be provided by:
   1) Insurer(s) authorized to transact business in the state where the Work or operations will be performed by Supplier; and
   2) Admitted insurers that maintain an A.M. Best's rating of not less than A-/VIII.

B. WORKERS' COMPENSATION including Employers' Liability insurance in an amount of at least:
   1) **$1,000,000**, bodily injury by accident – each accident;
   2) **$1,000,000**, bodily injury by disease – policy limit; and
   3) **$1,000,000**, bodily injury by disease each employee.

   Where applicable, evidence of coverage shall be required for Longshore and Harbor Workers' Compensation, Maritime coverage, Federal Employers' Liability Act and other unique exposures requiring endorsement of coverage.

   Workers' Compensation coverage must extend to every employee, including owners/officers of a closely held corporation and/or individuals operating as a sole proprietorship or partnership.

C. Unless otherwise indicated below, Supplier shall obtain and maintain a COMMERCIAL GENERAL LIABILITY ("CGL") insurance policy: 1) for Major Trades Suppliers with a limit of not less than **$2,000,000** per occurrence for both Premises/Ongoing Operations, **$2,000,000** Products-Completed Operations aggregate; and **$2,000,000** general aggregate applicable to claims other than Products-Completed Operations and 2) for all other Suppliers with a limit of not less than **$1,000,000** per occurrence for both Premises/Ongoing Operations, **$1,000,000** Products-Completed Operations aggregate; and **$1,000,000** general aggregate applicable to claims other than Products-Completed Operations. To the extent that Supplier's CGL insurance is subject to aggregate limits, the policy shall be endorsed so as to apply such aggregate limits separately to each Project.

   Coverage afforded under Supplier's CGL and any Commercial Umbrella insurance shall be provided on an occurrence basis and shall be subject to the terms of the Insurance Services Office ("ISO") Commercial General Liability Coverage Form CG 0001, or an equivalent form providing coverage at least as broad as the ISO form specified. There shall be no limitations or exclusions of coverage beyond those contained in the standard coverage form and coverage shall include liability arising from Premises/Operations, Elevators, Broad-Form Property Damage, Independent Contractors, Contractual Liability, Products-Completed Operations including Construction Defect, Contractual Liability or Personal Injury and Advertising Injury.

   All coverages shall be maintained in force for a period of three (3) years after Substantial Completion of the Project or for such period of time as is described in the Contract Documents ("Products-Completed Operations Period"). All terms and conditions of such coverage shall be maintained during this Products-Completed Operations Period, including the required coverage limits and the requirement to provide PEPPER and Owner with coverage as an **Additional Insured** for Products-Completed Operations. XCU and Work From Height Exclusions must be deleted when applicable to operations performed by the Supplier. XCU coverage must be identified as being included on the Certificate of Insurance.

D. COMMERCIAL UMBRELLA LIABILITY ("Umbrella Liability") shall be maintained by Supplier, providing the same coverage and with the same **Additional Insureds** as the primary policy in the amount of **$5,000,000** for Major Trade Suppliers and **$1,000,000** for all other Suppliers. All terms and conditions of such coverage shall be maintained during the three (3) year Project-Completed Operations Period, including the required coverage limits and the requirement to provide PEPPER and Owner with coverage as an **Additional Insured** for Products-Completed Operations. Umbrella Liability insurance required under this Purchase Order shall follow the form of the Commercial General Liability insurance, Business/Commercial Automobile insurance, and Employers' Liability insurance as required in the Purchase Order. The Umbrella Liability policy must be identified as 'follow form' on the Certificate of Insurance. To the extent that Supplier's Umbrella Liability insurance is subject to aggregate limits, policies shall be endorsed so as to apply such aggregate limits separately to each Project.

   When providing a Blanket Certificate of Insurance, the following wording must be included: "*All Work performed by [Supplier Company Name] for all Pepper Construction Company of Ohio, LLC jobsites. Additional Insureds: Pepper Construction Company of Ohio, LLC and all others identified at **Exhibit C – Non-CCIP** of the Purchase Order Agreement.*"

E. BUSINESS/COMMERCIAL AUTOMOBILE LIABILITY on an accident basis covering all Owned, Leased, Non-Owned and Hired Vehicles providing limits of liability for Bodily Injury and Property Damage of **$1,000,000** each occurrence, including its own employees.

F. ADDITIONAL INSURED: The Supplier's CGL and Umbrella Liability policies must include the parties listed in **Exhibit C – Non-CCIP** as **Additional Insureds**, on an ISO **Additional Insured** Endorsement (CG 2010 and CG 2037, Edition #07 04 or older, or equivalent) covering Ongoing and Completed Operations. Supplier's insurance will be Primary and Non-Contributory to any insurance carried by any of the **Additional Insured**. Supplier's required insurance shall apply separately to each **Additional Insured**. Any other insurance or self-insurance maintained by PEPPER or Owner shall be excess of, and non-contributory with, the coverage afforded by Supplier's CGL and Umbrella Liability insurance.

G. A Certificate of Insurance on an ACORD form, and the **Additional Insured** Endorsement (including a waiver of subrogation), must be delivered to the PEPPER Project Manager of record and PROVIDED TO THE PEPPER JOBSITE FIELD SUPERINTENDENT ***PRIOR TO THE COMMENCEMENT OF ANY WORK***. The Supplier shall notify PEPPER by email within thirty (30) days if such Certificate is to be altered, cancelled or allowed to expire.

H. Equivalent insurance coverage must be obtained from each sub-supplier, if any, before permitting them on the Project site. In the event Supplier fails to obtain such coverage from its lower tiers, protection of such parties shall be included within Supplier's insurance policies.

I. Supplier will be responsible for any deductible or self-insured retention under its insurance policies.

J. It is understood and agreed that PEPPER shall withhold payments to the Supplier until a properly executed Certificate of Insurance and endorsement providing insurance as required herein, accompanied by a signed Purchase Order Agreement, are received by PEPPER. The failure of PEPPER to withhold such payments or obtain the required Certificate or endorsement shall not be deemed to be a waiver of Supplier's obligation to provide the insurance required under the Purchase Order.

K. Supplier hereby waives any rights of subrogation against PEPPER, the Owner, the Architect, and any other **Additional Insureds** as required by this Purchase Order, the Owner Agreement or the Invitation to Bid. If insurance policies specified within this **Exhibit C – Non-CCIP** require an endorsement to provide for continued coverage where there is a waiver of subrogation, the Supplier will cause them to be so endorsed. This waiver shall apply to all first-party Property, Equipment, Vehicle, and Business/Commercial Automobile Liability claims (unless prohibited under applicable state statutes), and all third-party liability claims.

L. Limits under the Commercial General Liability, Business/Commercial Auto Liability, and Employer's Liability policies can be obtained by any combination of primary and excess coverage.

Pepper Construction

TRADE PARTNER SAFETY HANDBOOK

Contents

1. **INTRODUCTION** - This handbook has been provided to familiarize all TRADE PARTNERS and their SUPERVISORS with the Pepper Construction Company of Ohio, LLC (PEPPER CONSTRUCTION) safety rules, procedures, and guidelines for preventing jobsite accidents and injuries. It is the responsibility of the TRADE PARTNER to provide their Project Managers and Site Supervisors with a copy of this document. TRADE PARTNER is the chosen lexicon for SUBCONTRACTOR. Also, be advised that an officer of your company has read this handbook and agreed with its terms and conditions. This commitment assures your compliance with the safety rules, procedures, and guidelines outlined in this handbook, as well as all applicable Federal, State and Local regulations. This document does not replace, modify, or supersede the rights and obligations of the parties as set forth in the subcontract. The Trade Partner is ultimately responsible for the safety of its personnel and third parties that come in contact with the Trade Partner's operations. This handbook is not intended to replace the Trade Partner's policies or to make Pepper responsible for the subs' operations.

   Items that are **bolded** may exceed OSHA minimum requirements. If OWNER safety requirements apply, the stricter requirement will be followed.

2. **STATUTORY REQUIREMENTS** - Each TRADE PARTNER is expected to be aware of and comply with Federal, State, and Local safety regulations. In addition, each TRADE PARTNER has agreed to hold the Owner and PEPPER CONSTRUCTION harmless for all claims, damages (including legal fees), and/or penalties incurred because of TRADE PARTNER's failure to comply with such regulations.
3. **INSURANCE REQUIREMENTS** - TRADE PARTNERS may not start their work until a valid and acceptable certificate of insurance is on file with PEPPER CONSTRUCTION. This includes a copy being provided to the PEPPER CONSTRUCTION Site Superintendent.
4. **SAFETY PRE-QUALIFICATION** – Each TRADE PARTNER that will have direct employees on the jobsite must be Safety Prequalified by PEPPER CONSTRUCTION. The Safety Prequalification Information online application must be completed and submitted to PEPPER CONSTRUCTION prior to contract award.
5. **SAFETY PLANNING & PROGRAMS**

   5.1. **The TRADE PARTNER must submit a PEPPER CONSTRUCTION approved Project Specific Safety Plan.** Templates are provided by PEPPER CONSTRUCTION. The completed safety plan must be submitted to PEPPER CONSTRUCTION for review and acceptance prior to the Safety Plan Review Meeting and the start of work. The plan shall be updated as site conditions warrant and reflect changes in safety procedures that are necessary to maintain a safe jobsite.

5.2. **Safety Plan Review Meeting – all TRADE PARTNERS are required to attend a Safety Plan Review Meeting that must take place before any work starts.** The PEPPER CONSTRUCTION Superintendent will schedule the meeting. **Required attendees include the TRADE PARTNER full time Site Superintendent/Foreman** and the PEPPER CONSTRUCTION Superintendent. The TRADE PARTNER COMPETENT PERSON must be fully aware of this plan and the procedures necessary to eliminate any hazards.

5.3. **The TRADE PARTNER is required to review the Project Specific Safety Plan with their tradespeople prior to beginning work.**

6. **COMPETENT PERSON REQUIREMENT** - The TRADE PARTNER must designate a Competent Person in writing. It is the competent person's responsibility to initiate and maintain an effective safety process at the jobsite. **Each competent person shall have completed the 30-hour OSHA Construction Safety and Health Training course.**

7. **TRAINING** - Weekly toolbox and **daily Task Hazard Analysis (Job Safety Analysis) meetings are required** of all TRADE PARTNERS. Documentation of these meetings must be submitted to the PEPPER CONSTRUCTION site Superintendent weekly. Project meetings will include Safety as an agenda item and all TRADE PARTNER supervisors are required to attend.

8. **SAFETY ORIENTATION** - **TRADE PARTNERS are required to send trades people who are new to the project to the PEPPER CONSTRUCTION orientation before they begin work at the site.** PEPPER CONSTRUCTION will conduct the orientation meetings.

9. **INSPECTIONS** - TRADE PARTNERS are required to inspect daily the areas in which their employees are working and immediately report any unsatisfactory or unsafe conditions to the PEPPER CONSTRUCTION site Superintendent**. Each TRADE PARTNER will perform, at a minimum, weekly documented inspections of their work.** Documentation of these inspections must be submitted to the PEPPER CONSTRUCTION Site Superintendent weekly.

10. **CONTRACTOR VIOLATIONS** - If unsafe conditions, practices, or procedures are observed, the TRADE PARTNER supervisor will be requested to correct the situation. Failure to adequately correct the condition or refusal to comply or enforce the requirements referenced in this handbook may result in:

    10.1. Removal of involved employees from the jobsite;

    10.2. Removal of all TRADE PARTNER employees from the jobsite;

    10.3. Denial of future bid opportunities with PEPPER CONSTRUCTION.

11. EMPLOYEE VIOLATIONS - This procedure is established to provide for the discipline of employees who violate safety rules. Safety rules are written and enforced to provide for a safe and healthful place of employment.

11.1. All TRADE PARTNER Superintendent's and Foremen are responsible for the enforcement of the safety and health program on PEPPER CONSTRUCTION projects. In order to accomplish this, they must ensure that each employee is properly instructed in the use of safety equipment and safe work practices. PEPPER CONSTRUCTION will monitor the safety performance of TRADE PARTNERS working on the jobsite.

11.2. If violations of the statutory PEPPER CONSTRUCTION requirements and/or the Project Specific Safety Plan are observed, the responsible TRADE PARTNER must initiate the disciplinary policy with their employee. The response to a safety violation should be carefully evaluated based on the nature of the safety violation. It is imperative that the TRADE PARTNER Superintendent or Foreman warn employees when they violate a safety rule and remove any employee who refuses to comply with the safety rules from the PEPPER CONSTRUCTION project.

11.3. When an employee is observed violating a safety rule, the tradesperson's employer, and/or PEPPER CONSTRUCTION shall implement the following steps:

11.3.1. First offense – written warning to employee (all written warnings shall be documented using the TRADE PARTNERS Employee Safety Violation Notice or letterhead);

11.3.2. Second offense – written warning to employee with a phone call and/or letter to TRADE PARTNER office within 24 hours of violation. Employees shall be prohibited from working on PEPPER CONSTRUCTION projects for 2 working days.

11.3.3. Third offense – within any twelve-month period is grounds for immediate removal from the project and prohibition of working on PEPPER CONSTRUCTION projects for one year.

11.4. Serious Intentional Violations are defined as violations that may have potentially severe consequences, or place individual(s) in imminent danger. A serious intentional violation may result in immediate dismissal from the project and termination of the employees' ability to work on other PEPPER CONSTRUCTION projects. Examples of serious intentional violations include:

11.4.1. Smoking in non-designated areas;

11.4.2. Possession of alcohol, firearms, and/or illegal drugs;

11.4.3. Fighting or belligerent behavior;

11.4.4. Tampering with emergency equipment;

11.4.5. Working without a valid shutdown notification, hot work permit, or application of a Lockout/Tagout;

11.4.6. Working without proper fall protection, placing a person in imminent danger;

11.4.7. Entering excavations/trenches without appropriate sloping, shoring, or other protective measures, placing a person in imminent danger;

11.4.8. Entering areas designated and marked as “Do Not Enter”, placing a person in imminent danger;

11.4.9. Operating equipment without valid licensing or training certification;

11.4.10. Not reporting work related injuries and/or damage to PEPPER CONSTRUCTION equipment or property;

11.4.11. Failure to report and/or correct recognized safety hazards;

11.4.12. Repeated or multiple safety violations of the same nature;

11.4.13. Other acts, which indicate a TRADE PARTNER employee’s, disregard toward his/her safety, the safety of others, or neglect of proper care of PEPPER CONSTRUCTION property/equipment.

11.4.14. Falsify what transpired when reporting work place injuries or death.

11.5. TRADE PARTNER Superintendent or Foreman shall review with the employee the details of the safety violation including corrective actions and consequences.

11.6. Copies of the Safety Violation shall be forwarded to the PEPPER CONSTRUCTION Superintendent and Safety Director.

12. ACCIDENT REPORTING - Each TRADE PARTNER will report immediately to the PEPPER CONSTRUCTION site Superintendent, any accident or injury involving Trade Partner employees or the employees of their second-tier Trade Partner(s), damage to property, public or private, general liability or injury to non-employees. Additionally, a copy of each accident report is to be provided to the PEPPER CONSTRUCTION site Superintendent within 24 hours. A written investigation report must be provided within 24 hours of the accident or injury.

13. MEDICAL FACILITIES - First Aid supplies are available in the PEPPER CONSTRUCTION site Superintendent's trailer or job office. Emergency telephone numbers are also posted at this location. The emergency numbers will include a nearby medical facility.

13.1. By law, every TRADE PARTNER must provide a First Aid Kit in their job site office or gang box, provide at least one trained responder certified in First Aid/CPR, and administer care to injured workers.

13.2. TRADE PARTNERS shall provide transportation from the job site to the specified doctor's office or clinic. The employer is responsible for transporting the injured worker to the designated medical facility.

14. BLOODBORNE PATHOGENS

14.1. Exposure Determination - OSHA requires employers to perform an exposure determination in which employees may incur occupational exposure to blood or other potentially infectious materials. This exposure determination is made without regard to the use of personal protective equipment. (Employees are considered exposed even if they wear personal protective equipment). This exposure determination is required to list all job classifications in which the employees may be expected to incur such occupational exposure, regardless of frequency. The employer is also required to list job classifications in which some employees may have exposure if performing certain tasks or procedures.

14.2. Personal Protective Equipment - All personal protective equipment used at this project, for protection of bloodborne pathogens, will be provided without cost to employees by their employer. Personal Protective Equipment (PPE) will be chosen based on the reasonable likelihood of any possible exposure to blood or other infectious materials.

14.3. Hepatitis B Vaccine

14.3.1. All employees who have been identified as having possible exposure to blood or other potentially infectious materials will be offered the Hepatitis B vaccine at no cost to the employee by their employer. The vaccine will be offered within 10 days of initial assignment involving potential exposure. Employees who decline the Hepatitis B vaccine must sign a waiver. Employees who initially decline the vaccine but who later wish to have it will be provided the vaccine at no cost.

14.3.2. Employees who perform first aid only on an emergency basis, he/she will be offered the Hepatitis B vaccine. In the event emergency first aid has been rendered, and responder has possible exposure to blood or other infectious

materials, he/she will be offered the Hepatitis B vaccine at no cost to the employee by their employer. If he/she declines the Hepatitis B vaccine, he/she will sign a waiver.

15. **CONCRETE/MASONRY CORING & CUTTING** – If the TRADE PARTNER scope of work includes core drilling or sawing in concrete slabs and/or concrete/masonry walls, **the TRADE PARTNER is required to use Ground Penetrating Radar or other suitable technology to define areas where it is safe to drill or cut in order to avoid damaging rebar, post-tension cables, electrical conduit or the like.**

16. **CONCRETE PUMP TRUCKS** – The TRADE PARTNER responsible for that equipment on site is the "Controlling Entity" for that activity and must verify that ground conditions are stable and that outrigger bearing pressures can be safely met. The TRADE PARTNER responsible for that work must establish a safe travel path of equipment, outrigger locations and ensure that no hazards such as overhead or underground utilities or vaults or structures exist.

17. **CONFINED SPACE ENTRY** - All employees must be protected from hazards associated with confined space entry. No employee shall be permitted to enter a confined space that has not first been monitored to insure sufficient oxygen levels exist, toxic gas levels are below OSHA Permissible Exposure Limits (PEL), and combustible gases are below the Lower Flammable Limits (LEL). All work with exposure to confined spaces must be competed in accordance with OSHA 1926 Subpart AA.

18. **CONTRABAND & FIREARMS** – The following items shall be considered contraband - stolen property, firearms, weapons, explosives, and any other hazardous substances and are strictly prohibited on any PEPPER CONSTRUCTION jobsite. Persons or employees found to be using or in possession of, or concealing any of the above-unauthorized items will be permanently removed from the jobsite.

19. **UTILITY AND CRITICAL SYSTEM SHUTDOWN** - Utility Shutdowns and Critical System Service must be scheduled 10 calendar days before commencement of the work or as specified by client/project team. This work may result in a curtailment of owner's services and operations must be accomplished at the owners required schedule. The PEPPER CONSTRUCTION Superintendent in conjunction with the owner Project Manager/Facilities representative shall coordinate all shutdown requests.

    All utility or system connections, shut-off, or interruptions must be scheduled with PEPPER CONSTRUCTION before commencement of the work.

    19.1. Valves and other shutdowns shall be located before work begins.

    19.2. Contingency plans shall be developed in the event of critical system interruption.

19.3. All Critical Systems shall be identified before the start of demolition. Lines shall be painted or flagged to indicate their presence.

20. CRANES

20.1. **All operators of mobile, boom truck, lattice boom, telescopic boom (Hydro) and tower cranes, shall maintain a valid certification card issued by the Operating Engineers Certification Program (OECP), the National Commission for the Certification of Crane Operators (NCCCO) or a company program reviewed by an outside auditor.** The certification must be specific to the type of crane being operated. Certifications must be current and in good standing. Certifications must be available for verification by PEPPER CONSTRUCTION at any time while the operator is on site.

20.2. The TRADE PARTNER responsible for crane work on site must verify that ground conditions are stable and outrigger bearing pressures imposed can be safety met. The TRADE PARTNER responsible for that work must establish and plan a travel path for the equipment, determine outrigger locations and ensure that no hazards such as overhead or underground utilities or vaults or structure exist. The TRADE PARTNER must perform these inspections and notify PEPPER CONSTRUCTION prior to any lift or pick taking place.

20.3. Crane appurtenances that exceed 200' above the ground or within 20,000 feet of an airport shall be marked and lighted, unless an exemption is received from the FAA. Contractors erecting the crane must review and complete FAA Form 7460 as required. Notice of Proposed Construction or Alteration (faa.gov)

20.4. Annual inspection is required, and a copy provided to PEPPER CONSTRUCTION upon request.

20.5. Tower Cranes must be inspected by a Third-Party Qualified Person after erecting, climbing, jumping, de-jumping and/or dismantling activities. Additionally, a Registered Professional Engineer must verify that the host structure is strong enough to withstand forces imposed on it by braces, anchorages, and supporting floors. A copy of this inspection must be provided to PEPPER CONSTRUCTION upon request.

20.6. All signal persons and riggers must have certified training. Certifications must be current and in good standing. Certifications must be available for verification by PEPPER CONSTRUCTION at any time while the operator is on site.

20.7. Tag lines or guide ropes shall be used to control all loads.

20.8. Equipment operators and truck drivers must not operate closer than recommended minimum clearance distances from overhead or underground electrical wires. If work is required near these utilities, the TRADE PARTNER must consult with the PEPPER CONSTRUCTION site Superintendent about alternative action plans.

20.9. The TRADE PARTNER is required to complete a crane lift plan prior to any crane operations and must be submitted forty-eight hours prior to the operation. A DAILY HOISTING PERMIT is required to be completed for all daily operations as part of the pre-start task hazard analysis process.

21. NON-CRANE HOISTING – when using equipment such as but not limited to pulley, winches, come-a-longs, forklifts and gantry systems, the hoisting system must be designed and engineered to be used in such a manner. The hoisting system includes all hoisting equipment and components, anchor points, attachment points and rigging. Documentation, including the weight of objects being hoisted and capacity of each hoisting component and hoisting system as a whole, must be provided to Pepper Construction prior to hoisting.

22. DRONE USAGE - If the usage of an aerial drone is required by any Trade Partner/vendor on any PCCO project sites, the Trade Partners/vendors must contact the appropriate PCCO Safety Director for consultation with the PCG Legal Department prior to use and to ensure that the Trade Partner meets requirements as outlined in FAA's Small UAS (Unmanned Aircraft Systems) Rule (Part 107).

23. DEMOLITION - Demolition of existing electrical, plumbing, and/or mechanical must not commence without the following steps.

23.1. **The utility must be identified and marked by the trade responsible for that utility.**

23.2. **Markings will be placed at 4ft (max) intervals and be color-coded that signify the following:**

23.2.1. Green – Safe to Cut and Remove

23.2.2. Red or not color coded Do Not Cut or Remove – Stop Work and contact PEPPER CONSTRUCTION supervision.

23.3. Surveying tape for color coding/flagging of the 'to be removed' materials and mechanicals shall be used.

24. DRONE USAGE - If the usage of an aerial drone is required by any Trade Partner/vendor on any Pepper Construction project sites, the Trade Partners/vendors must contact the appropriate PEPPER CONSTRUCTION Safety Director for consultation with the PCG Legal Department prior to use.

25. DRUG & ALCOHOL POLICY

25.1. All illegal and unauthorized substances, drugs, look-alike drugs, synthetic drugs, alcoholic beverages, and drug paraphernalia are strictly prohibited on PEPPER CONSTRUCTION jobsites.

25.2. Persons or TRADE PARTNER employees found to be using or in possession of, or concealing of any of the above items, will not be allowed on the PEPPER CONSTRUCTION jobsite.

25.3. Any employee of the TRADE PARTNER, suspected to be under the influence of drugs or alcohol, will be referred to their supervisor to determine their compliance to this Drug & Alcohol Policy and further disposition of the employee.

25.4. All employees, their vehicles, and personal property are subject to search and inspection, before entering or departing a PEPPER CONSTRUCTION job site.

25.5. PEPPER CONSTRUCTION has adopted a “Zero Tolerance” policy regarding drug or alcohol usage. Drug or alcohol use during the work shift is prohibited (This includes breaks and lunch).

25.6. If the client requires participation in a Substance Abuse and Drug Testing Program, all trade partners, sub-tier contractors, and term contractors shall require their employees to participate in the COATS Substance Abuse and Drug Testing Program. Information about the program can be found on the Midwest Toxicology website www.midwesttoxicology.com.

25.7. Pepper Construction will utilize the Construction Safesite system to verify whether the employee is “available” or “not available” for work.

25.8. All contractors must verify their employee's availability before sending them to a Pepper Construction project.

25.9. Tradesmen shall present their photo ID and valid substance abuse card to the Pepper Construction onsite representative for documentation. In the event a card is lost supplemental info will be accepted until a new card is issued. Tradesmen that do not have a valid card shall not be permitted on site until such time as one is obtained.

26. ELECTRICAL

26.1. TRADE PARTNERS are responsible for maintenance of their extension cords, electrical tools, and equipment. Defective extension cords & equipment shall be removed from service immediately. OSHA requires daily inspection of extension cords, tool cords, and equipment cords.

26.2. **TRADE PARTNERS must always use GFCI's, even if using permanent building power.**

26.3. Temporary Power Installation - Temporary electrical power, such as receptacle and lighting wire, may not be installed on PEPPER CONSTRUCTION sites as open conductors. Open conductors are copper conductors covered with one layer of insulating material. **Temporary wiring connections with open conductors and /or utilizing wire nuts must be wrapped with electrical tape for additional protection. Temporary electrical service conductors, unless installed in metallic raceways, must utilize flexible cords and cables which carry the trade name "HARD SERVICE" or "JUNIOR HARD SERVICE", as defined in the 2002 edition of the NEC/Article 400/Table 400.4.**

26.4. Electrical extension cord use:

26.4.1. All cords shall be designed for hard or extra hard usage. (Not less than 12-gauge conductors)

26.4.2. Contractors shall identify all extension cords with a tag or be imprinted identifying the contractor company name.

26.4.3. All extension cords and portable equipment shall be inspected prior to each use.

26.4.4. Any damaged or defective cord or tool shall not be used. Any worn, frayed or damaged extension cords shall be removed from service. **Damaged extension cords may not be repaired and put back into use.**

26.4.5. Extension cords shall be placed so they do not cause slip, trip or fall hazards. Where cord sets have the potential to be damaged or where sets pose an unsafe condition, cords shall be suspended at a minimum of 8' above the work area or otherwise protected from damage. **Means used to protect cords from damage shall not create a slip, trip, or fall hazard to workers as well as the public. Circumstances in which carts, aerial/scissor lifts, workers, or the public must traverse over cord sets the protection must protect the cord from damage as well as prevent a slip/trip fall hazard.**

26.4.6. End of Day Roll-Up: Each contractor and/or TRADE PARTNER is responsible for disconnecting all extension cords from electrical sources at the end of the day or working shift with exception of cords used for running essential equipment such as pumps and battery chargers. All extension cords shall be "rolled up" and stored at appropriate storage areas such as (gang boxes, material storage areas etc.).

26.5. Energized parts must be guarded per OSHA 1926 Subpart K.

26.5.1. The permanent or an acceptable temporary cover must be provided. Non-conductive material is acceptable for temporary covers. However, cardboard is an unacceptable temporary cover.

26.5.2. All temporary covers must have a positive fastening device to secure it to the panel. Magnetic temporary covers may only be used during the work shift for guarding if the personnel responsible for the open panels are required to leave the immediate area. Magnetic covers may not be used overnight or if tradesmen will not be present for the next shift.

26.5.3. It is acceptable to leave a panel open if the area that contains the panel is secured or isolated per the requirements of OSHA 1926.403 (i)(2).

26.5.4. All energized devices, such as light switches and electrical outlets, shall have non- conductive and positively secured covers in place. If devices are not energized, covers are not required per PEPPER or OSHA requirements. **The use of electrical tape as a substitute for covers is not permitted. If covers must be removed for the purpose(s) of drywall finishing, painting, wall covering installation or other types of work, all energized devices shall be de-energized and locked out/tagged out by a qualified person prior to cover removal.**

26.6. Any employee who may be working on or near (within 10') live electrical parts shall be qualified as explained in OSHA 1910 Subpart S. Live parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations.

26.6.1. Examples of increased or additional hazards include, but are not limited to, interruption of life support equipment, deactivation of emergency alarm systems, and shutdown of hazardous location ventilation equipment or removal of illumination for an area.

26.6.2. Examples of work that may be performed on or near exposed energized electrical conductors or circuit parts because of infeasibility due to equipment design or operational limitations include performing testing or trouble shooting of electrical circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a

continuous process that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

26.7. If the live parts cannot be placed in an electrically safe work condition, other safety related work practices shall be used to protect employees who might be exposed to the electrical hazards involved. Such work practices shall protect each employee from arc flash and from contact with live parts directly with any part of the body or indirectly through some other conductive object.

26.8. **It is the goal of PEPPER CONSTRUCTION to achieve 100% lockout/tagout when working on all systems that have the potential to become energized. If it is determined that lockout/tagout can't be achieved, the TRADE PARTNER must implement an energized work safety policy. If this policy must be implemented, immediate notification of the PEPPER CONSTRUCTION Superintendent shall occur prior to initiating the work.**

26.9. Lockout/Tagout Procedures shall be followed when work is to be performed on de-energized equipment. TRADE PARTNERS are required to develop and implement an energy control or lockout/tagout program and maintain onsite.

27. EXCAVATIONS

27.1. At any time, a TRADE PARTNER-controlled employee is involved in the creation of, or working in, any trench or excavation, that TRADE PARTNER must provide an on-site COMPETENT PERSON who has certification of excavation task specific training. This documentation must be provided to the PEPPER CONSTRUCTION site Superintendent upon request.

27.2. **The TRADE PARTNER shall attend a Daily Coordination Meeting - The PEPPER CONSTRUCTION Superintendent and the TRADE PARTNER(s) will meet before work starts at the beginning of each shift.** The meeting agenda shall contain the following items:

27.2.1. A discussion plus documentation of previous days (shift) trenching and excavating activities on the Master Utility Location Drawing.

27.2.2. A discussion of the scope and location of work for the days (shift) work.

27.2.3. Verification of known underground utility locations and applicable private and public locates using the Master Utility Location Drawing.

27.2.4. Discussion of any private and public locates or relocates needed for upcoming trenching and excavating activities.

27.2.5. Review of the excavation protective system i.e. sloping, benching, trench box prior to being utilized during the shift.

27.2.6. Review of the pothole/daylight/hand excavation procedures for all located utility crossing points.

27.3. **TRADE PARTNER Tradesmen Task Hazard Analysis - TRADE PARTNERS shall perform a Task Hazard Analysis for each trenching and excavating activity.** If more than one activity occurs in a shift, additional THA's shall be performed. Agenda shall include:

27.3.1. Work scope.

27.3.2. Known overhead and underground utility locations and applicable private and public locate markings,

27.3.3. Requirement that limits machine excavating, digging or auguring up to a 4-ft. limit on either side of the utility markings.

27.3.4. Requirement that all located utility crossing points are exposed by day lighting procedures with vacuum truck or hand excavate. Must have EYES ON buried utilities before continuing to machine dig.

27.4. **TRADE PARTNERS are required to install and maintain barricades around excavations/trenches to protect pedestrian and vehicular traffic from entering.**

27.5. Equipment operators and truck drivers must not operate closer than recommended minimum clearance distances from overhead or underground electrical wires. If work is required near these utilities, the TRADE PARTNER must consult with the PEPPER CONSTRUCTION site Superintendent about alternative action plans.

27.6. The excavation must be sloped or benched per OSHA standards, shored and /or safeguarded through the use of a trench box or other engineered earth retention device(s) when excavation reaches five (5) feet or greater in depth. Protection against cave-in at a depth of less than five (5) feet may be required if the COMPETENT PERSON determines that soil or other conditions warrant such protection.

27.7. **Written excavation permits will be completed as required, at least daily.**

28. EXCAVATIONS - UNDERGROUND UTILITIES

28.1. Our goal is to eliminate underground utility damage incidents on our projects, and to deliver accurate as-built information on utilities installed during our projects.

28.2. Each SUBCONTRACTOR shall attend the Safety Plan Review meeting per Section 5 item 5.2 of the Safety Handbook. The Underground Utility Damage Prevention policies and procedures specific to this project will be discussed in the meeting.

28.3. Each SUBCONTRACTOR shall attend a SAFETY ORIENTATION pursuant to section 8 of the Safety Handbook. The Underground Utility Damage Prevention policies and procedures specific to this project will be discussed in the orientation.

28.4. Each SUBCONTRACTOR shall follow the processes outlined in section 27 EXCAVATIONS of the Safety Handbook. This includes attending daily coordination meetings lead by the PEPPER CONSTRUCTION Superintendent. Coordination meetings will take place PRIOR to commencing work on any given day.

28.5. Each SUBCONTRACTOR will perform a Task Hazard Analysis for each trenching and excavate activity and will review with the PEPPER CONSTRUCTION Superintendent prior to commencing work on any given day.

28.6. Each SUBCONTRACTOR performing underground work is required to call in their own public utility locates and keep the dig numbers valid per 811 laws.

28.7. PEPPER CONSTRUCTION will coordinate and schedule the private utility locates

28.8. Each SUBCONTRACTOR shall perform potholing of underground utilities to get “Eyes-On” the utility PRIOR to continuing with machine excavating for the work at the following conditions:

28.8.1. Where the excavation for the new utility crosses any underground utility

28.8.2. Where the excavation for the new utility is within 4 ft of either side of the onsite utility marking (i.e., paint or flags)

28.8.3. Where the PEPPER CONSTRUCTION superintendent directs the SUBCONTRACTOR to do so

28.9. Each SUBCONTRACTOR shall survey their installed utility PRIOR to backfilling. Survey shall be performed in accordance with the Survey Data Requirements Below and shall be delivered to PEPPER CONSTRUCTION no later than 24 hours after the data is collected.

28.10. As-Built Survey Data Requirements of **New Underground Utilities**

28.10.1. Contractors responsible for the installation of underground utilities on the project shall provide as-built information as outlined below. This information will be utilized to update the 3D model of new utilities and provide an accurate as-built deliverable to the client. Each contractor performing underground utility work is responsible to provide this information in accordance with the project schedule and ensure the appropriate information is captured and delivered to Pepper Construction.

Pepper may require this data to be provided throughout the course of construction to help inform installation of other work on site.

28.11. Newly installed utilities as a part of the contractor's scope of work shall be surveyed prior to backfill of utility as follows:

28.11.1. Survey top of utility elevation

28.11.2. Document size of utility at each survey point

28.11.3. Document type of utility at each survey point

28.12. Utilities shall be surveyed at the following frequency

28.12.1. At the start and end of each utility run

28.12.2. At each change in direction of the utility and/or at each tie in to new or existing structures

28.12.3. At each change in elevation of the utility (excluding changes in elevation due to gravity slope of piping)

28.12.4. If an "As-Built Intent Plan" is provided in the scope of work, as-built data should be collected on utilities at locations in conformance with this plan.

28.13. Information shall be provided in a format as follows:

28.13.1. Information can be generated using AutoCAD, Civil 3D, or similar

28.13.2. Information shall be delivered in the .dwg file extension version 2010 or newer

28.13.3. Coordinate System of CAD file to be in accordance with the State Plan Coordinate system.

28.13.4. Points shall be represented by linework in the CAD file as follows

28.13.4.1. Points shall be represented with linework or Civil 3D points

28.13.4.2. Points shall be shown at the correct "X, Y, Z" location relative to the project's site CAD file provided by the design team and/or Pepper Construction

28.13.4.3. Points shall be accompanied by a text label/annotation clearly noting elevation of top of utility, size of utility, and type of utility

28.13.4.4. Points shall be connected by linework to indicate the complete run of the system

28.13.5. Points shall be provided in a .csv file format in PENZD format

28.14. Where possible and at the direction of the Pepper site superintendent, sight tubes should be installed at locations where as-built survey data has been collection for reference throughout the project.

28.14.1. Install minimum diameter 4" PVC pipe on top of the exposed utility

28.14.2. Install removable cap

28.14.3. Write on outside of pipe (above grade) the utility type, utility size, and appx utility depth below grade

28.14.4. Top of sight tube should be 2' above grade U.N.O.

29. FALL PROTECTION

29.1. A fall protection program is designed to provide the required methods to prevent employees from exposure to or suffering an injury due to a fall from an elevation. Due to the extreme severity of fall related injuries, TRADE PARTNERS must exercise every precaution required. The use of fall protection systems and equipment is required on all PEPPER CONSTRUCTION jobsites. Any employee found to be in violation of PEPPER CONSTRUCTION Fall Protection requirements is subject to immediate removal from the jobsite. A “Fall Protection System” is defined as some engineered, physical means or methods that are designed to eliminate a fall exposure to employees. Under OSHA 1926 Subpart M, it is required to provide “Guard Rail Systems, Safety Net Systems or Personal Fall Arrest Systems.” General Requirement: Fall protection is required whenever employees are exposed to falls of six (6) feet or greater, to a lower level.

29.2. OSHA 1926 Subpart M states that there may be work activities that qualify for an exception to the six (6) foot rule. However, it continues to state, “There is a presumption that it is feasible and will not create a greater danger to implement at least one of the above referenced systems.” PEPPER CONSTRUCTION supports this presumption of feasibility, and any exception must have the approval of the PEPPER CONSTRUCTION Safety Department and site Superintendent. It has been demonstrated that effective fall protection can be provided for many concrete leading-edge operations, pre-cast plank and double-T erection, and low sloped (4 in 12 or less) roofing operations. It is required that the appropriate fall protection systems be provided. This must be addressed in the Site-Specific Safety Plan that each TRADE PARTNER is contractually required to provide to PEPPER CONSTRUCTION.

29.2.1. **Concrete Leading-Edge Operations -** Engineered fall protection systems must be used to minimize fall exposures.

29.2.2. Roofing – A Fall Protection System is required for all low sloped (4 in 12 or less) roofing operations when the fall distance exceeds six (6) feet. Safety monitors are not considered positive fall protection. In addition, any employee engaged in the installation of sheet metal materials (including but not limited to flashing, coping caps, etc.) must use a Fall Protection System.

29.2.3. **Non-Roofing Work on Low Sloped Roofs -** Other trade tasks unrelated to roofing work being performed on low-sloped roofs must install a Controlled Access Zone (CAZ). The CAZ must be created with flagging or barricades, and established a minimum of fifteen (15) feet from unprotected sides or edges. A flagged or barricaded path must be established and maintained from the point of access to the CAZ. Any employee outside the CAZ must utilize a Fall Protection System.

29.2.4. **Steel Erection –** All steel erection activities (erectors, connectors, and decker's) are contractually required by PEPPER CONSTRUCTION, to include 100% fall protection when fall hazard is six (6) feet or greater.

29.2.4.1. **The TRADE PARTNER (fabricator and their erector) is required to submit in writing a detailed plan of all fall protection to be used on the project.** This includes a detailed analysis of all fall hazards greater than six feet. The plan shall include a detailed description of the specific personal fall arrest systems to be used including manufacturers and/or engineered designs, limitations of use, and the minimum clearance distance required for the system to prevent the worker from striking the floor/deck below. Systems that do not prevent contact with the surface below will not be permitted.

29.2.4.2. PEPPER CONSTRUCTION further requires that decking be installed every two stories or thirty - (30) feet, whichever is less, before erecting additional levels.

29.2.4.3. Any exceptions based on feasibility or constructability constraints must have the written approval of the PEPPER CONSTRUCTION Safety Department, Project Manager and site Superintendent.

29.2.4.4. **The Erector will be required to cover all floor openings on every floor to include elevator shafts, stair openings,**

mechanical shafts, etc. before erection continues on levels above. PEPPER CONSTRUCTION must approve variations due to job conditions of this requirement.

29.2.4.5. Working floors to be considered "controlled access" areas for ironworkers and decker's only until the floor has achieved 100% fall protection unless personal fall protection systems are utilized. **All openings to be covered and cabled before access by other trades.**

29.2.4.6. **All openings greater than 16 square feet shall have cable guardrail systems installed in addition to being covered.** Stanchion support locations should be coordinated to facilitate installation of interior shaft walls. If necessitated by fall protection distance requirements, stanchion installations should occur after decking on the floor above has been completed.

29.2.4.7. Cable must not deflect more than 2 in. when a 200-lb. force is applied. If a 2-in. deflection is exceeded additional intermediate supports must be provided. Maximum 2-in. deflection must be maintainable. **Maximum distance between supports is 15 feet. Bracing/Kickers shall be provided at corner stanchions to maintain plumb when cables are pulled tight.**

29.2.4.8. Roof levels must be protected with a Perimeter Guardrail System (top rail and mid- rail). PEPPER CONSTRUCTION must approve variations due to job conditions of this requirement.

29.2.4.9. Overhead protection – On multi-story steel erection projects, a minimum of two decked floors one of which must be poured shall be in place between the erector's raising gang and trades below whose work is unrelated to the steel erection process.

29.2.4.10. 12 ft. Rated Lanyards: 12 ft. rated double hook or (Y) lanyards will be required when employees are tying off at their feet and/or when circumstances exist where the free fall distance prior to the lanyard engaging is beyond or exceeds six feet (6 ft.).

29.2.5. **Masonry Fall Protection (Overhand Operations) - A Fall Protection System must be provided to all workers exposed to a six (6) foot or greater fall hazard. Therefore, the OSHA 1926 Subpart M fall protection exception does not apply to overhand bricklaying operations on PEPPER CONSTRUCTION projects.** This

includes those engaged in overhand work including the laying of brick, block, and related materials, striking, and brushing joints. In relation to operations included in OSHA 1926 Subpart L, Scaffolding, all regulations shall be followed.

29.2.6. Floor Openings & Perimeter Protection – Guardrail systems are provided at the perimeter, stairway openings, and shaft openings. **Smaller floor openings, including those less than 2" in diameter, are to be covered and secured.** This is done to provide for the safety of all personnel on the job site.

29.2.6.1. A guardrail system is defined as a toprail @ 42", a midrail @ 21", and includes a toeboard.

29.2.6.2. Hole covers must be installed and maintained. If a hole cover is removed by another trade that TRADE PARTNER or trade assumes responsibility to cover and maintain that hole.

29.2.6.3. Hole covers shall be designed to withstand twice the weight of workers, equipment, and materials. Floor covers must be raised or suitably barricaded to prevent overloading from mobile equipment such as scissors and boom lifts.

29.2.6.4. Covers shall be secured against displacement horizontally and vertically.

29.2.6.5. All covers shall be marked with the words "HOLE, FLOOR OPENING, OR DO NOT REMOVE."

29.2.6.6. **All floor covers must be sealed to the floor with watertight sealant unless otherwise specified by PEPPER CONSTRUCTION supervisor or Safety Department**

29.2.6.7. If a TRADE PARTNER finds it necessary to remove a guardrail system, an authorized PEPPER CONSTRUCTION representative must be notified, and the removal and replacement of the protective device is to be coordinated with them. This procedure is critical in assuring that these systems maintain their required protective designs.

29.2.6.8. Should a TRADE PARTNER damage any protective system, they must notify an authorized PEPPER CONSTRUCTION supervisor immediately. Do not remove or repair these systems without notifying PEPPER CONSTRUCTION. Whenever guardrail systems or covers are removed, employees must be protected with appropriate fall protection systems. Failure to replace protective systems, may

subject the responsible employee to removal from the jobsite. Further, **failure to replace protective system will result in PEPPER CONSTRUCTION performing this work and the cost for this activity will not be negotiable, based on the SUBCONTRACT AGREEMENT with the respective firm.**

29.3. **Leading Edge rated lanyards – leading edge rated lanyards (Class B) will be required when an employee's anchor point is below the employee's dorsal D-Ring, and in the case of a fall, the lanyard would contact sharp edge, such as, but not limited to, steel, metal decking and concrete.**

30. FALLING OBJECTS PREVENTION – Personal fall protection has long been the #1 priority in construction for good reason, as falls from height remain the most frequent cause of construction worker fatalities. Recently, a new type of fall protection is gaining momentum, falling object protection, due to the number of injuries and fatalities resulting from dropped or falling objects. When objects (tools, material, etc.) have the potential to drop to a lower level, some type of preventative measure must be taken. Examples of preventative measures include but are not limited to:

30.1. Controlled Access Zone – a physical barrier to prevent access to area(s) below overhead work.

30.2. Tool tethers – Tethers must be specifically designed for the sole purpose of preventing tools from being dropped. Job made products are not permitted.

30.3. Spotter – a person, designated as a spotter, must be positioned to prevent unauthorized access below overhead work. This person shall have no other duty while designated as a spotter. If the spotter must leave the area, the overhead work must cease.

31. FIRE PROTECTION

31.1. Good housekeeping practices are the singularly most important element of fire protection. Combustible materials must be placed in trash receptacles and removed by the TRADE PARTNER performing the work from the project in a timely fashion.

31.2. When portable heaters are used, make certain they are placed well away from the combustible materials (both side to side and above and below.)

31.3. Temporary heaters will be checked for correct operation prior to being put into service each day.

31.4. Fire extinguisher shall be placed in conspicuous areas and be accompanied with proper signage.

31.4.1. All fire extinguishers shall be placed in boxes or on stands painted red or hung on walls with red backboards at approximately 48" height. No fire extinguisher may be allowed to rest on bare ground.

31.4.2. One portable dry chemical fire extinguisher not rated less than 20lb ABC to be provided within five (5) feet of wherever gasoline operated equipment is being used.

31.4.3. Fire extinguishers are not to be tampered with or removed from assigned locations (except for emergency use). If discharged for any reason, the fire extinguisher must be replaced or recharged immediately.

31.5. Procedures to be followed in the event of a fire should be rehearsed regularly.

31.6. Hot Work Operations - In occupied buildings or at the discretion of the PEPPER CONSTRUCTION Superintendent a Hot Work Permit is required for operations or activities involving an open flame or work which may produce sparks or smoke including but not limited to: welding, torch cutting, soldering, grinding, chop saw use and open flames.

31.6.1. Permits are valid for only the date, shift, and location indicated.

31.6.2. It is the responsibility of the TRADE PARTNER to provide adequate fire extinguishers in the work area. One portable dry chemical fire extinguisher not rated less than 20lb ABC to be provided within twenty-five (25) feet of work.

31.6.3. A fire watch shall be maintained whenever welding, cutting, or spark producing operations take place and there is a threat of fire.

31.6.4. A properly trained fire watch shall be provided and shall have no additional duties.

31.6.5. Fire watch shall be continued for a minimum of (40) minutes after hot work has been completed. Procedures may vary by exposure.

31.6.6. The Hot Work Permit must be submitted to an authorized PEPPER CONSTRUCTION representative. The PEPPER CONSTRUCTION site Superintendent may designate an authorized person for this purpose. All guidelines contained within that Hot Work Permit must be followed.

31.6.7. Asphalt/Pitch kettles are covered by the Hot Work Permit Program. Tar Pots are always required to be attended. Under no circumstances shall “tar pots” be located closer than 35 feet to any combustible storage area.

31.7. Flammable Storage/Use

31.7.1. Gasoline and other flammables must be kept in an approved metal safety can (approved by a nationally recognized testing laboratory) for the handling and use of flammable liquids. Further, a safety can, by definition, is a container with a capacity of 5 gallons or less and equipped with a spring-closing lid and spout cover, a means to relieve internal pressure, and flash-arresting screen. The limits of quantities stored must meet local, state, and/or federal regulations. Plastic gas cans are prohibited. Flammables must be stored in properly labeled containers (HAZCOM requirement). It is the responsibility of the TRADE PARTNER to provide adequate fire extinguishers. Smoking is strictly forbidden in areas where flammables are stored or used. “NO SMOKING” signs must be posted and obeyed.

31.7.2. Portable fuel tanks will be installed in accordance with federal, state, and local requirements. It is the Contractor's responsibility to secure all required permits and provide proof of same.

31.7.3. Flammable liquids shall be stored outside, away from buildings, in a safe and secure location in standard approved storage containers or tanks.

31.7.4. No flammables may be stored inside tool trailers, job toolboxes or other closed locations.

31.7.5. Storage of fuel gas cylinders shall be outside in an area approved by PEPPER CONSTRUCTION.

31.7.6. Portable tanks not to be nearer than 20 feet from any building. Portable fuel tanks/containers are not allowed inside the building under any circumstances.

31.7.7. At least one portable fire extinguisher having a rating of not less than 20-B units shall be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

31.7.8. Fueling and refueling operations for equipment, whether gasoline or diesel, shall be done outside of the building, no closer than 35’ from the building.

31.7.9. Liquefied Petroleum Gas (L-P Gas) - Storage of L-P gas cylinders within buildings is strictly prohibited. L-P gas containers, when in use, must stand on a substantially level, firm surface and secured in an upright position to prohibit falling, tipping or toppling of containers. Heating equipment must

be located at least 6 feet from L-P gas containers and the heat directed away from the containers.

32. HAZARD COMMUNICATION

32.1. In accordance with PEPPER CONSTRUCTION's Hazard Communication Program, all hazardous material containers must be properly labeled. Every TRADE PARTNER must supply a Safety Data Sheet (SDS) to the PEPPER CONSTRUCTION site Superintendent at least seven (7) days before introducing a hazardous material to the jobsite. A list of the hazardous materials used on the jobsite by the TRADE PARTNER will be maintained in the TRADE PARTNER'S file. An additional set will be maintained in PEPPER CONSTRUCTION's site job file.

32.2. The TRADE PARTNER must maintain their written HAZCOM Program at the jobsite, along with the training program utilized for their employees. Revision to this program must be provided when requested by the PEPPER CONSTRUCTION Site Superintendent or Safety Department.

32.3. The SDS must be maintained on the job site. A copy of the PEPPER CONSTRUCTION HAZCOM Program may be obtained from the PEPPER CONSTRUCTION Safety Director's office, upon written request.

32.4. All chemicals on site will be stored in their original or approved containers with a proper label attached. Any container not properly labeled should be given to the Contractor Supervisor for labeling or proper disposal.

32.4.1. Immediate us means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

33. HOUSEKEEPING

33.1. **Our policy is "nothing hits the floor".** All work operations shall be provided with appropriate trash receptacles for debris, scrap, cutoffs and packaging. All debris, especially combustible scraps and debris must be cleared from the building and work areas daily.

33.2. **Daily housekeeping by each TRADE PARTNER is essential for maintaining a safe job site. TRADE PARTNERS are responsible for housekeeping procedures in their respective work areas. The working definition for Daily Housekeeping at PEPPER CONSTRUCTION is as follows:**

33.2.1. All debris, especially combustible scraps and debris must be cleared from the building and work areas daily.

33.2.2. Nails, wire ties, and other accessories shall be promptly removed from lumber or any other used lumber at the time of stripping or dismantling. If it is not practical to remove or bend nails in used lumber to avoid tripping hazards and nail traps, the lumber must be stacked for cleaning and re-use. Lumber must not be scattered.

33.2.3. The work site, especially stairways and walkways, shall be kept clear of obstructions that may create tripping or other hazards.

33.2.4. Tools must be stored in toolboxes. If laid aside temporarily, the tools must be placed where they will not present a hazard. Tools must not be placed in a position to fall on someone at a lower level.

33.2.5. All construction materials and supplies stored neatly in designated areas.

33.2.6. Floors shall be swept daily using wax based sweeping compound to remove accumulated construction dust.

33.3. **TRADE PARTNER failure to maintain their work areas as required or directed will result in PEPPER CONSTRUCTION performing this clean-up. The cost for this activity will not be negotiable, based on our SUBCONTRACT AGREEMENT with the respective firm.**

34. INDOOR AIR QUALITY - In General the use of gas-powered equipment is prohibited within the building structure. If no other feasible option, the contractor using said gas powered equipment must provide safeguards: such as, continuous CO air monitoring for the duration of the work in that same area, installation of scrubbers on the equipment used, local ventilation, or scheduling off hours. All Federal and Local requirements must be followed.

35. LADDERS - Our goal is to reduce the risk posed by using ladders to access work at height by reducing the overall percentage of work completed using ladders. This involves Identifying alternatives to ladder use for work scopes at the planning phase. Alternatives to ladders include scissor lifts, man lifts, and scaffolds.

When ladders are determined to be the best option, the following requirements apply:

35.1. **Step ladders 6' or greater of working height shall be platform ladders unless the users are protected with suitable fall personal fall protection systems.**

35.2. All ladders must be used in strict accordance with the manufacturers and ANSI requirements.

35.3. Step and extension ladders shall be constructed of fiberglass and rated Type IA, IAA or IAAA. **Wood and metal ladders are prohibited.**

35.4. Whether using portable, fixed, or job-made ladders, proper safety precautions must always be followed. Employees must always ascend or descend a ladder with three (3) points of contact.

35.5. Ladders must be inspected daily; broken or damaged ladders will be removed from service immediately and destroyed.

35.6. Extension ladders cannot be separated for use as single units. Extension or straight single ladders must be properly secured at the top and if possible, the bottom. A minimum of thirty-six (36) inches is required above the top access point of an extension or straight ladder.

35.7. Documentation of ladder safety training must be provided at the request of the PEPPER CONSTRUCTION site Superintendent.

35.8. For work from ladders within ten feet of the exposed edge or perimeter of the building or structure; where other positive means of conventional fall protection do not already exist; positive means of fall protection, such as but not limited to personal fall arrest systems (PFAS) will be employed.

36. MASONRY CONSTRUCTION

36.1. A Limited Access Zone shall be established whenever a freestanding masonry wall is being constructed.

36.2. The Limited Access Zone shall be established before the start of the wall construction, equal to the height of the wall to be constructed plus four feet, run the entire length of the wall, and established on the side of the wall that will not have scaffold installed.

36.3. Limited Access Zone entry is restricted to employees who are actively engaged in the construction of the wall. No other employees shall be permitted to enter the zone.

36.4. The Limited Access Zone shall remain in place until the wall is adequately supported to prevent overturning. OSHA considers bracing as adequate support.

36.5. An engineered bracing design shall be used for all freestanding masonry walls over eight (8) feet in height to prevent overturning and collapse. Bracing shall remain in place until permanent supporting elements of the structure are in place.

36.6. All block and brick cutting activities that create the potential for respirable crystalline silica dust exposure shall use water as an engineering control. If it is determined by PEPPER that water cannot be used, all exposed employees shall wear approved respirators and the operation shall be in an area where non-protected employees and the general public are not exposed to silica containing dust.

37. MATERIAL HANDLING

37.1. Materials shall not be stored outside of designated construction areas.

37.2. **Sheet materials (ex: drywall, plywood, oriented strand board, hardboard, fiberboard, overlay plywood) and doors shall not be stored on edge or on drywall carts.**

37.3. **In order to maximize mobility and safe transport of materials, loading of drywall carts shall be limited to one half of the rated weight capacity.**

37.4. **Metal banding shall not be used for concrete formwork. Acceptable means include poly or nylon.**

37.5. **Material Handling for Multi-Story Structures**

37.5.1. The practice of swinging or pulling a suspended load into a building by any method is strictly prohibited. This practice places employees, equipment, and the structure at substantial and unnecessary risk. This operation must be analyzed in the site-specific safety plan.

37.5.2. Proper loading systems including, but not limited to, are: material/man hoists, platform lifts, landing platforms or lookouts.

37.5.3. If guardrails are removed on landing platforms, lookouts or hoists, personal fall protection must be provided for exposed employees. Additionally, if guardrails are removed, flagging must be installed to warn of fall hazard or unprotected edge condition.

37.6. **Free-Rigging is prohibited: Free rigging is the direct attachment to or placement of rigging equipment (slings, shackles, rings, etc.) onto the tines of a powered industrial truck for a below-the-tines lift. This type of lift does not use an approved lifting attachment.**

37.7. Personnel are strictly forbidden from riding on material hoisting equipment at any time.

38. MOTORIZED EQUIPMENT

38.1. All motorized equipment that has limited or obstructed view by the operator during reverse or backing up movement, must have a back-up alarm installed and operating. This includes skid steer equipment.

38.2. All operators of motorized equipment/machinery must wear seatbelts if said equipment has been manufactured with one.

38.3. All equipment operators must shut down their engines during the refueling process. Fire extinguisher(s) must be readily available during refueling, located within twenty-five (25) feet of lateral distance.

38.4. Only authorized person's licensed and certified as required by local, state or federal mandates, shall operate machinery, equipment, tools or vehicles.

38.5. **No riders on machinery or equipment without proper seating accommodations. Riders in trucks are to be seated, in a seat while the vehicle is moving. No workers may be transported in the back of a pick-up truck AT ANY TIME.**

38.6. All mobile machinery must have operable backup alarms and/or flashing strobe type lights at ALL times.

38.7. A flag person must be used to direct the backing up of a vehicle in any congested or noisy area. Any flag person exposed to vehicular traffic must be properly trained and certified for this task and must always wear a reflective vest.

38.8. The use of a mobile phone while operating any power-industrial trucks or power-industrial equipment and earth moving equipment is strictly prohibited.

39. TRANSPORTATION OF PERSONNEL

39.1. **Transportation of persons in the back of pick-up trucks is prohibited.**

39.2. No person will be permitted to ride with arms or legs outside of a vehicle body, in a standing position on the body, on running boards, seated on side fenders, cabs, cab shields, bed of the truck or on the load.

39.3. The number of passengers in passenger-type vehicles shall not exceed the number that can be seated

39.4. Trucks used to transport personnel shall be equipped with a securely anchored seating arrangement, a rear end gate, and guardrail. Steps or ladders, for mounting and dismounting, shall be provided.

39.5. All tools and equipment shall be guarded, stowed, and secured when transported with personnel.

39.6. Vehicles transporting personnel shall not be moved until the driver has ascertained that all persons are seated, and the guardrails and rear end gates are in place or doors closed.

39.7. Getting on or off any vehicle while it is in motion is prohibited.

39.8. All motor vehicles shall be shut down prior to and during fueling operations.

40. PERSONAL PROTECTIVE EQUIPMENT

40.1. TRADE PARTNERS are responsible for providing their employees with all necessary PPE.

40.2. Clothing - Appropriate clothing must always be worn. **Clothing must consist of long pants and a shirt that covers the shoulders with a minimum 4" sleeve. Clothing must not be torn and must be free of offensive sayings or pictures. Loose clothing, shorts, athletic shoes, or sleeveless shirts are not permitted on the jobsite.** Jewelry of any kind is strongly discouraged on the jobsite. The risk of becoming "caught on" or "caught in" increases substantially when necklaces, dangling jewelry, or rings are worn.

40.2.1. High Visibility Clothing

40.2.1.1. Flaggers and workers exposed to hazards posed by vehicles, earth moving equipment, extendable boom forklifts and cranes shall wear high visibility reflective clothing. High visibility clothing is defined as reflective and fluorescent vests or shirts that workers should wear to make them more visible when working near traffic and heavy equipment, in all light conditions, day and night. The following guidelines shall be used for selection of high visibility clothing:

40.2.1.2. ANSI Class 1 garment: For workers that are separated from vehicular traffic that does not exceed 25 miles per hour; where background settings and worker tasks are not complex.

40.2.1.3. ANSI Class 2 garments: Necessary for greater visibility during inclement weather; where work background is more complex and is close to moving traffic and vehicles; workers' attention will likely be diverted from traffic traveling at speeds from 25 to 50 miles per hour.

40.2.1.4. ANSI Class 3 garments: Traffic speed is greater than 50 miles per hour; worker must be conspicuous and identifiable as a person through the full range of body motions at a minimum of 1,280 feet.

40.2.1.5. At the discretion of Pepper Construction, projects may require high visibility clothing 100% of the time.

40.3. Footwear - Construction workers and visitors are required to wear a well-constructed hard sole, closed-toe work shoe.

40.4. Gloves – Appropriate hand protection is required when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. Leather and cotton gloves are not considered cut resistant.

40.4.1. The use of cut resistant gloves is always required for trades with exposure to hand and finger cut hazards.

40.4.2. 100% hand protection is required for the following trades: ELECTRICAL, MECHANICAL, PLUMBING, CARPENTRY, DRYWALL, CONCRETE AND DEMOLITION.

40.5. **Hard Hats - Approved hard hats must be worn on the job site at all times**. TRADE PARTNERS are not allowed to work without hard hats. PEPPER CONSTRUCTION will not provide loaner hard hats to TRADE PARTNER's employees.

40.6. Hearing Protection - Appropriate hearing protection must be utilized for the anticipated noise levels encountered. The threshold for hearing protection is 90dBA.

40.7. Respirators - The use of some types of respirators requires a medical examination and documented fit testing. Documentation must be provided to PEPPER CONSTRUCTION and kept on file.

40.8. **Eye Protection - The use of safety glasses with side shields or other suitable eye protection is required at all times.** Additionally, face shields must be worn during the use of powder actuated tools, chop saws, partner saws, grinders, or for tasks that create flying debris that can strike the face.

40.9. **Welding shields shall attach to hard hats.**

40.10. Roofing - All workers involved with charging of roofing kettles shall wear task specific PPE. These items would include hood that provides face/neck protection, suitable outer- wear and gauntlet gloves.

41. POWDER ACTUATED TOOLS

41.1. Only employees who have been trained in the operation of the tool in use shall be allowed to operate a powder-actuated tool.

41.2. All Personal Protective Equipment (PPE) required (including but not limited to eye protection, face protection, gloves and hearing protection) must be used during the

operation of the tool. All live loads remaining in a used clip shall be discarded properly.

41.3. Proper disposal could include a container of water or other closed container that does not allow accidental detonation of unused loads.

42. PRE-CAST / TILT UP WALL PANEL ERECTION

42.1. Pre-cast wall erector is to submit a written erection plan to the project team at least 7 days prior to mobilization on site.

42.2. Erection plan must detail the following:

42.2.1. Erection plan must document the competent person for erector. Any change of competent person on the project site requires a written notification to the project team.

42.2.2. Bracing plan: engineered drawing to be submitted to Pepper Construction and reviewed prior to erection of panels. Bracing must be installed per the engineered drawing, any deviation must be submitted and approved by the engineer of record.

42.2.3. Panel connection details: engineered drawing to be submitted to Pepper Construction, panel connection details must be reviewed by the erection competent person and the Pepper Construction Superintendent prior to starting erection.

42.2.4. At no time will a panel be erected and left without being braced or have all permanent connections installed per the engineered drawing. Any deviation from the plan must be submitted and approved by the engineer of record.

42.2.5. Panel connection details at all 90-degree connections or any connection that is not a butt joint must be installed per the engineered drawing.

42.2.6. Panel connection welds: welds must match details per the engineered drawing, any field modifications must be submitted and approved by engineer of record.

42.2.7. Rigging plan to be submitted in this document: details of all rigging needed including but not limited to specialty hardware for picking and tripping loads.

43. PUBLIC PROTECTION - Construction activities attract the public. TRADE PARTNERS must provide safety barriers, walkways, lighting, fences, and any other means necessary to protect the public from possible injury because of the TRADE PARTNERS work. This must be part of the site-specific safety plan.

43.1. Construction work areas must be barricaded and/or posted with appropriate signage. At no time shall work be performed over persons or aisles without such barricades in place to prevent access.

43.2. Red barricade tape is to be used to enclose hazardous work areas. Entry into these areas is restricted to authorized personnel.

43.3. Yellow barrier tape shall be used to enclose areas where caution must be exercised.

43.4. When steel plates, wood planking or similar covers are located where there is pedestrian traffic or exposure, they shall be tapered on all sides with cutback, cold mix or similar material to eliminate tripping hazards. Covers will be non-slip in nature or have a non- slip surface.

44. RADIOS - Electronic entertainment devices are prohibited in the job site work area. Radios are permitted in the site trailer or office primarily for public notification of emergencies (such as weather, security alerts, etc.). Repeat violations of this policy will result in the appropriate discipline, up to and including removal from the jobsite.

45. SCAFFOLDING

45.1. Per OSHA 1926 requirements, any employee that uses, erects, or dismantles a scaffolding system must be trained in this task. TRADE PARTNER documentation of this training must be provided to PEPPER CONSTRUCTION upon request.

45.2. **A scaffold tagging system shall be used to identify the status of each scaffold. Scaffold status should include the following categories: complete/all requirements met, complete/hazards noted, and/or incomplete do not use.**

45.3. **Fall protection at heights above 6 feet is required during scaffold erection and dismantlement. Fall protection systems may include horizontal static lines or vertical lifelines.**

45.4. The footings for scaffolding must be rigid, sound, and capable of carrying the load without settlement or displacement. Unstable objects such as barrels, boxes, loose brick, concrete blocks, or pieces of scrap lumber shall not be used to support scaffolding. Mudsills, base plates, and leveling jacks must be used.

45.5. **Standard scaffolding, whenever feasible, shall have guardrails (top and mid rails) whenever the work platform is located at six (6) feet or greater above lower level.** If X- brace pivot point is greater than thirty- eight (38) inches but less than forty-eight (48) inches above work platform, only a midrail is required. If X-brace pivot point is greater than twenty (20) inches but less than thirty (30) inches above the work

platform only a top rail is required. All other scaffolding situations require guardrails per OSHA standards.

45.6. **All scaffolding that is less than forty-five (45) inches wide must have guardrails whenever the work platform is at forty-eight (48) inches or greater above lower level.** This includes Perry and Baker-type scaffolds. Toe boards are required to provide for falling object protection, unless the area below is barricaded and be considered a limited access zone.

45.7. Work platforms must be fully planked, except during the erection and dismantling process. At that time, two planks or an eighteen (18) inch wide (minimum) work platform will be provided. Planks must be scaffold grade or documentation provided substantiating that plank material to be of equal or greater strength. This includes planking used by concrete contractors on forming systems. All planking of work platforms must be overlapped a minimum of twelve (12) inches or secured from movement with cleats. Scaffold planks shall extend over their end supports not less than six (6) inches or more than twelve (12) inches. Planks must be inspected before each use and cracked or damaged planks must be removed from service prior to use.

45.8. **An access ladder or equivalent device, to allow safe access, must be provided for all scaffolding. If the fall distance exceeds 15', stair towers or internal ladder systems must be used. Safe access includes a gate, chains or other barriers that eliminate fall hazards after platform is accessed.**

45.9. All diagonal bracing must be in place and secure. Braces do not take the place of mid and top rails (except as noted above.)

45.10. The scaffold system must be tied to and securely braced against the structure per the minimum requirements of the OSHA standard. If the scaffolding system is to be enclosed for wind or weather protection, it must be designed by a competent person to withstand the additional loads.

45.11. **When work is to be completed in stairwells rolling scaffolds shall not be used.**

45.12. **Narrow frame scaffolds (Perry/baker type), are not designed to support additional pick boards, walk boards, or scaffold planks. This practice is not allowed.**

45.13. Training, inspection procedures, maintenance, and operation of self-propelled mobile scaffolds must comply with the manufacturer's requirements and documentation. This documentation must be provided when requested by the PEPPER CONSTRUCTION Safety Department or site Superintendent.

45.14. Outriggers or stabilizers must be used, as required, by the manufacturer, guardrails in place and access gates closed while unit is in use.

45.15. Minimum safe distances from energized power lines must always be maintained (refer to the site-specific safety plan).

45.16. Manually Propelled Mobile Scaffolds - All casters shall be provided with a positive locking device to prevent scaffolding from rolling. Platforms will be tightly planked for their full width. The floor or work surface must be free from voids, holes, or obstructions. The height of rolling scaffolds must not exceed four (4) times the shortest base dimension.

45.17. Two-Point Suspension Scaffolds - The roof iron or hooks shall be of proper size, design, and material. Installation must be secure and anchored properly under the supervision of a trained, competent person. Tiebacks shall serve as a secondary means of anchorage installed at right angles to the face of the structure and secured to a structurally sound element of the building. All employees must be trained in the hazards associated with suspended scaffolding, as well as the controls necessary to eliminate each hazard. Fall protection systems must be used in conjunction with suspended scaffolds.

46. STILTS

46.1. A competent person shall first train each employee who is assigned to wear stilts in the safe use and inspection of the equipment. The competent person shall also make the determination that the tradesman is proficient in the use of stilts before the tradesman is assigned to work on them.

46.2. Stilts shall be thoroughly inspected before each use.

46.3. Stilts shall only be used on hard level terrain, which is free of debris, slippery surfaces, electrical cords, or other obstructions, such as stored materials in the work path.

46.4. Tradesmen are responsible to notify their supervisors of any unsafe conditions or hazards concerning the safe use of stilts. Stilts shall not be used until all unsafe conditions have been corrected.

47. SCISSORS AND AERIAL LIFTS

47.1. Scissors and Aerial Lifts may not be "field modified" for uses other than those intended by the manufacturer unless the manufacturer has certified the modification in writing.

47.2. All lifts shall be inspected before use. Any deficiencies or equipment in need of repair shall be reported to the Superintendent or Foreman before use. If any equipment needs repair, the equipment shall not be used until authorization is received from the Superintendent or Foreman. Equipment in need of repair shall be tagged out until serviced. Inspection documentation shall be maintained with each piece of equipment for review.

47.3. Employees shall always stand firmly on the floor of the basket or platform, and shall not sit or climb on the edge or rails of the basket or use planks, ladders, or other devices for a work position.

47.4. Lifts shall not be loaded in excess of the designed working load. Lifts are designed for lifting personnel and small hand tools. Lifts are not to be used in lieu of a crane. Aerial lifts shall not be used to transport construction materials.

47.5. A full body harness shall be worn with a self-retracting lanyard attached to the boom or basket when working from an aerial lift.

47.6. Operator must have documented proof of training (available upon request) and use equipment as intended.

47.7. Lifts must not be field altered and must use only engineered attachments approved by the manufacturer. It is highly recommended that operator of lift does not work alone.

48. SILICA EXPOSURES – any TRADE PARTNER that may create respirable silica dust must develop and implement a site silica exposure control plan in accordance with OSHA Subpart Z 1926.1153.

49. UTILITIES - Equipment operators and truck drivers must be cautioned not to operate closer than recommended distances from overhead or underground electrical wires. If work is required near these utilities, the TRADE PARTNER must consult with the PEPPER CONSTRUCTION site Superintendent about alternative action plans. Whenever the TRADE PARTNER undertakes excavation work, it is their responsibility to contact the appropriate one call locating services. Work may not start until these dig numbers have been submitted to the PEPPER CONSTRUCTION site Superintendent and the schedule of excavation approved.

50. UTV (Utility Type/Terrain Vehicles)

50.1. To safely operate a utility type vehicle, the operator must use similar safe work habits as used with tractors, skid steer loaders, and ATVs. A safe, successful driver should become familiar with the machine before using it. This can be done by reading the owner's manual and following safety labels found on the vehicle. A qualified operator

(salesperson) can also demonstrate the correct operation.

50.2. Safety practices to follow when driving a UTV:

50.2.1. Maximum speed while operating a UTV on a Pepper jobsite is 5 mph.

50.2.2. Always keep legs and arms inside the vehicle.

50.2.3. Drive slowly and turn smoothly to avoid an overturn.

50.2.4. When hauling cargo, the vehicle's center of gravity is raised, increasing the chance of overturning.

50.2.5. Drive completely up or down a slope or hill before making a turn. Do not turn the vehicle in mid-slope or hill as this increases the probability of overturning.

50.2.6. Use the appropriate speed on rough terrain.

50.2.7. Operators and passengers have been thrown from vehicles.

50.2.8. Stay clear of ditches and embankments.

50.2.9. Passengers must be tall enough to reach handhold while their backs are against the seat and their feet are flat on the floorboards.

50.2.10. Each passenger must ride in his/her own seat, not anywhere else on the UTV.

50.2.11. Operators must back up carefully and utilize horn.

50.2.12. Operators should be free from the influence of drugs or alcohol.

50.2.13. Due to the hauling purpose of a UTV, special attention should be paid to making sure cargo or material is properly secured during transport.

51. VISITORS - Any person not directly involved with the on-site construction of this Project shall not enter the site without first going to PEPPER CONSTRUCTION's job office and signing a visitor's release and obtaining a hard hat and safety glasses which is to be returned to PEPPER CONSTRUCTION. Visitors must always be accompanied by a person that has attended site orientation, is responsible for that (person/group) visitor on site and is familiar with the PEPPER CONSTRUCTION Site Safety Plan. All visitors must wear required PPE items such as hardhats, safety glasses, well-constructed hard sole, closed-toe work shoe and long pants. Visitors must not enter Construction or Restoration areas wearing shorts, skirts, open toed-shoes or high-heels. Visitors must sign-out when leaving the project. Note: Contractors are responsible and must always accompany equipment repair vendors brought on site.

52. WELDING AND CUTTING

52.1. The TRADE PARTNER must initiate a Hot Work permit with the PCCO Superintendent prior to conducting welding and cutting operations.

52.2. When necessary to provide protection for other employees and materials, screens or shields must be used where it is feasible.

52.3. All equipment used for welding and cutting including welding cables, gas cylinders, regulators and gauges, hoses, and torch sets shall be inspected each day before use.

52.4. **Flash back arrestors shall be installed at the oxy-acetylene regulators in addition to the required torch head protection.**

52.5. Valve protection caps shall always be in place except where cylinders are in use or connected for use. Regulators and hoses will be removed at the end of the work shift.

52.6. Compressed gas cylinders will not be stored inside of any structure – this includes gang boxes, storage trailers and similar closed spaces.

52.7. Personal Protective Equipment – Head and eye protection must always be worn. Hard hats with eye and face protection for welding applications. Safety glasses with side shields or goggles are required when chipping or grinding a work piece if not wearing a welding helmet. All fabric garments must be resistant to spark, heat, and flame. Respiratory Protection is needed when ventilation is not sufficient to remove welding fumes or when there is risk of oxygen deficiency. Suitable welding gloves are required.

52.8. Welding fume extractors must be used for all hot work in occupied facilities to prevent the spread of fumes and smoke. Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes, smoke at the source, and keep the concentration of them in the breathing zone within safe limits as defined in OSHA 1926 Subpart D.

52.9. For all welding and cutting operations, keep 35’ clear of combustibles in all directions.

52.10. Shield combustible flooring with wet sand, fire retardant tarpaulins or sheet metal. Clean the area of oily deposits and trash. Cover any storage or other combustibles that cannot be moved away. It is the responsibility of the TRADE PARTNER to

provide, install and maintain welding blankets when conditions warrant their use. Block off any duct openings where sparks can spread.

PURCHASE ORDER FOR MATERIAL

Date:
No.:

5185 Blazer Parkway, Suite 101, Dublin, OH 43017
614 793-4477 Fax: 614 793-4465

To:

Attn:
Phone: Fax:
Email:

Ship to:
("Project")

Attn:
Phone: Fax:
Email:

Purchase Order Dollar Value: $ Subject to retainage of ___% Cash Discount: Payment Terms:	Job No.: Vendor No.: Subjob: Phase No.	MINIMUM INSURANCE: See Article 5 and **Exhibit C**

Furnish all material, equipment, and insurance as required to provide all _____ work ("Work") for the above-referenced Project in strict accordance with the Contract Documents as further described herein. This Work is to be provided for the _____ price, including all applicable taxes, of _____ and ____/100 Dollars ($_____) ("Purchase Order Price").

This Purchase Order for Material must be signed and received, in addition to submitting an acceptable Certificate of Insurance, prior to delivering any materials, tools or equipment ("Materials") on site. This information must be submitted before any payouts or accounting functions may proceed.

The Owner for this Project is _____ ("Owner") and the Architect for this Project is _____ ("Architect").

A COPY OF SUPPLIER'S UP-TO-DATE INSURANCE CERTIFICATE MUST BE ON FILE WITH PEPPER'S SUPERINTENDENT AT THE JOBSITE PRIOR TO BEGINNING WORK ON THIS PROJECT. PLEASE SEE ARTICLE 5 AND **EXHIBIT C** FOR FURTHER INSTRUCTIONS.

SUPPLIER SHALL SUBMIT INVOICES BY THE 15TH OF EACH MONTH. SEE ARTICLE 23, BILLING PROCEDURES.

Contract Documents applicable to this Purchase Order for Material (Articles 1 through 23 inclusive) are as follows:

- Exhibit A – Contract Document Listing
- Exhibit B – Scope of Work
- Exhibit C – Insurance Requirements
- Exhibit D –04/01/22 Jobsite Safety Handbook
- Exhibit E – Project Schedule as prepared by Pepper Construction Company of Ohio, LLC

Any additional Exhibits are identified on the following page 2.

Supplier agrees that the subject matter of this Purchase Order is confidential in nature and that Supplier will not provide any third-party with any information contained herein without the prior written consent of PEPPER CONSTRUCTION COMPANY OF OHIO, LLC.

TERMS AND CONDITIONS ACCEPTED:

By: _____
Printed: _____
Title: _____
Dated: _____

PEPPER CONSTRUCTION COMPANY OF OHIO, LLC

By: _____
Printed: _____
Title: _____
Dated: _____

_____
Second Approval Signature

Additional Exhibits:

SUPPLIER OBLIGATIONS

You, as Supplier, agree with Pepper Construction Company of Ohio, LLC ("PEPPER"), as follows:

1. Acceptance

Supplier shall be deemed to have accepted this Purchase Order for Material ("Purchase Order" or "Agreement") upon Supplier's (a) signing and returning to PEPPER the acknowledgment copy of this Purchase Order or (b) submission of any shop drawings, cut sheets or other submittals, or (c) shipment of any of the Materials subject to this Purchase Order, whichever occurs first. Any acceptance of this Purchase Order is limited to acceptance of the express terms of the offer contained within this Agreement and any Exhibits attached hereto. Any proposal for additional or different terms or any attempt by Supplier to vary in any degree any of the terms of this Purchase Order in Supplier's acceptance is hereby objected to and rejected, but such proposals shall not operate as a cancellation of this Agreement unless such variances are in the terms of the description, quantity, price or delivery schedule of the Materials, but shall be deemed a material alteration thereof, and this Purchase Order shall be deemed accepted by Supplier without said additional or different terms. If any court or arbitration tribunal deems this Purchase Order to be an acceptance of Supplier's prior offer, then such acceptance is limited to the express terms contained on the face hereof, in this Supplier Obligations section and in the Contract Documents referenced on the face hereof. Additional or different terms or any attempt by Supplier to vary in any degree any of the terms of this Purchase Order shall be deemed material and are hereby objected to and rejected. The Parties expressly intend that this Article 1 govern the interpretation of their rights and responsibilities and that it shall supersede any different interpretation that would result from the application of UCC section 2-207 regarding conflicting documents or legal authority to similar effect.

2. Contract Documents

This Purchase Order for Material as defined on page 1 includes, but is not limited to, the Agreement between PEPPER and Owner ("Owner Agreement"), all addenda, modifications, revisions, Drawings, Specifications, details, all general, technical and supplementary conditions (collectively, the "Contract Documents"). A listing of the Contract Documents is found at **Exhibit A**, and Supplier's Scope of Work is found at **Exhibit B**. In case of conflict between the Contract Documents and this Purchase Order for Material, the more stringent term or the highest quality materials shall be required. Supplier agrees to similarly bind its Sub-suppliers to the same conditions.

This Agreement, the terms of which both Pepper and Supplier are mutually bound, requires compliance with all applicable federal, state, and local law, including but not limited to Chapter 371 of the Kentucky Revised Statutes, and sections 371.400 to 371.425 of the Kentucky Revised Statutes, commonly known as the Kentucky Fairness in Construction Act.

The exchange of copies of this Purchase Order and of signature pages by facsimile ("fax") transmission (whether directly from one fax device to another by means of an internet connection or whether conveyed electronically via the internet), by email in pdf format, or by any other electronic means intended to preserve the original graphic and pictorial appearance of a document, or by combination of such means, shall constitute effective execution and delivery of this Purchase Order as to the Parties and may be used in lieu of the original Purchase Order for all purposes. To that end, signatures of the Parties transmitted by fax, electronic format, or via DocuSign shall be deemed to be their original signatures for all purposes.

3. Taxes

Supplier shall pay all sales taxes and any other tax or levy applicable to this Purchase Order.

4. Price Escalation

This Purchase Order includes any and all price escalation throughout the duration of the Project.

5. Insurance

As set forth in **Ex. C – Non-CCIP**, Supplier shall maintain, at its own expense, during the procurement and delivery of materials or equipment on the jobsite and throughout the warranty period, insurance written by insurance companies acceptable to PEPPER with the minimum limits and coverage as indicated or, if higher, the requirements set forth in the Contract Documents.

6. Assignment/Default

Supplier shall not sublet or assign this Purchase Order, nor sell or assign the proceeds of this Purchase Order for Material without the prior written consent of PEPPER, and any such subletting or assignment without PEPPER's written consent shall be null and void. Any assignment for the benefit of Creditors, of Accounts, of Receivables or of any monies due under this Purchase Order to a Creditor, Lender or Trustee shall be a material default of this Purchase Order. A sale of a majority interest in Supplier shall be considered a default under this Purchase Order. PEPPER shall have the right to assign this Purchase Order for Material, without the consent of Supplier.

Should Supplier suffer any form of financial distress so that it could not give reasonable assurance to PEPPER that it can continue to perform its obligations under this Purchase Order, PEPPER may give written notice to the Supplier to begin with all necessary diligence to cure such defaults within a twenty-four (24) hour period or failing to do so, PEPPER may, without prejudice to any other remedies it may have under the law or in equity, terminate this Agreement and look to the Supplier for payment of all damages which it incurs. PEPPER'S remedies shall include, but not be limited to, its right to proceed with procurement of materials from other suppliers, the cost of which will be charged against the balance of any sums due Supplier. In the event of such a breach, in addition to any other remedy PEPPER may have, the Supplier agrees to indemnify, defend, and hold PEPPER harmless from all losses, damages, expenses (including reasonable attorneys' fees), as well as any judgments suffered by PEPPER as a result of Supplier's acts or omissions in the performance of its Work. PEPPER shall have the right of set off and to deduct from any balance due under this Purchase Order for Material or any other accounts of purchase orders under which PEPPER is holding funds due the Supplier, the amount of any losses, damages, or expenses as described above.

7. Contract Termination

PEPPER may terminate this Purchase Order in whole or in part in PEPPER's sole discretion without any liability to the Supplier. Upon receipt of written notice of termination, Supplier shall stop all work hereunder except as PEPPER may otherwise direct in writing and the Supplier will be entitled to payment for Materials approved and accepted by PEPPER and by Owner (including all Materials specially manufactured pursuant to this Purchase Order at the date of its termination), and actually paid to PEPPER by Owner, plus reasonable cancellation or restocking charges to the extent recoverable under Contract Documents.

8. Shop Drawings and Submittals

Supplier shall promptly submit Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of PEPPER or other suppliers or subcontractors.

9. Material Delivery

Material delivery to the jobsite shall be handled in accordance with the following:

A. Cost of all shipping of Materials, freight to the jobsite and insurance of same is the responsibility of the Supplier.

B. Supplier must notify PEPPER's on-site Superintendent forty-eight (48) hours prior to delivering any Materials. Copies of the delivery ticket will be stamped, showing the actual time and date shipment was received.

C. Each shipment of Material shall contain a packing slip with the correct nomenclature of contents and the box or carton containing this information must be so marked. At the time of shipment, one (1) copy of said packing slip shall be forwarded to the destination of shipment to alert PEPPER's Superintendent as to what Material is in transit so that arrangements can be made at least forty-eight (48) hours in advance to receive, allocate and store said Material.

D. If Supplier fails to adhere to the foregoing notification and other requirements, PEPPER reserves the right to refuse, warehouse, or return to the carrier the shipment in question. All related costs incurred by PEPPER, *e.g.*, handling, storage, protection, etc., will be borne by Supplier.

E. No charges will be allowed for cartage, packaging or otherwise, except as specified in this Purchase Order. All merchandise is subject to PEPPER's inspection upon arrival. Payment shall not constitute acceptance. PEPPER may return rejected merchandise or hold same; transportation, handling, and other expense therewith shall be charged to Supplier.

10. Time

TIME IS OF THE ESSENCE OF THIS PURCHASE ORDER! Should Supplier fail to provide the contracted for Materials in accordance with the Project Schedule as described in **Exhibit E** ("Schedule") established by PEPPER, Supplier hereby agrees to indemnify PEPPER for any loss or damages caused by such delay, but only to the extent caused by acts or omissions of the Supplier, or anyone directly or indirectly employed by Supplier or anyone for whose acts Supplier may be liable. Supplier agrees to indemnify and hold PEPPER harmless from any costs, damages, or expenses (including reasonable attorneys' fees) incurred by PEPPER as a result of Supplier's failure to perform any term or provision of this Purchase Order. PEPPER shall have the right to deduct from any sums owed to Supplier the amount of any costs, damages, or expenses (including reasonable attorneys' fees) incurred by PEPPER as a result of any failure on the part of Supplier to perform any of the terms or provisions of this Purchase Order. If such costs exceed the unpaid balance of the Purchase Order, Supplier shall immediately pay the difference to PEPPER.

11. Revisions/Changes

When PEPPER so orders in writing, the Supplier shall make any and all changes in the Work which are in the general Scope of this Agreement. Adjustments in the Purchase Order Price or Purchase Order time resulting from such changes, if any, shall be set forth in a Change Order pursuant to the Contract Documents. No adjustment shall be made for any changes performed by the Supplier that have not been ordered in writing by PEPPER.

As additional information or revisions are provided by PEPPER, Owner or Architect, the Supplier shall review such work and notify PEPPER within ten (10) business days of any cost or schedule changes to the Purchase Order for Material. If no response is received within this time frame, it will be assumed that no additional costs or time extensions will apply. Any changes which are made without prior written authorization of PEPPER's Project Manager will be done at Supplier's own risk and payment for such changes is not guaranteed.

A Pending Change Request Log shall be submitted electronically by the Supplier to the PEPPER Project Manager at the time of each monthly Application for Payment submission. Such Log shall identify any outstanding change requests ("CRs") as well as correlating CR date, description, dollar value and the status of the Change Request. Receipt of such Log does not imply acknowledgement or approval of identified CRs, but rather that such CRs have been submitted for review. CRs are finalized when incorporated into Supplier's Purchase Order via Change Order. Change Order pricing must be in accordance with the Contract. Monthly progress payments may be delayed or withheld by PEPPER if such Pending CR Log is not timely provided by Supplier to PEPPER.

12. Final Approval

Supplier agrees that all Material shall be accepted subject to the final approval of PEPPER and the Owner's authorized representative, and that such decision shall be final.

13. Liens/Bonds

In the event that PEPPER receives a notice or claim of lien from a sub-supplier of Supplier, PEPPER shall have the right to require the Supplier to bond over the lien in an amount of One Hundred Fifty Percent (150%) of the claim. Should PEPPER determine, in its sole discretion, that Supplier is not justified in refusing to pay the claim, after three (3) business days' written notice to Supplier, PEPPER shall have the right to pay a sum sufficient to discharge such lien or obligation and charge the same against any amount owned Supplier. PEPPER shall also have the right to require the Supplier to furnish and pay for a lien release bond in an amount not less than One Hundred Fifty Percent (150%) of (a) the sum of any final lien waivers the Supplier fails to provide or (b) the amount of any lien claims. Provided payment is made for Work properly performed, Supplier agrees to defend, hold harmless and indemnify PEPPER and Owner against any loss, damages, judgments and expenses (including reasonable attorneys' fees) which PEPPER or Owner may sustain in connection with any lien or claim but only to the extent caused by acts or omissions of the Supplier, or anyone directly or indirectly employed by Supplier or anyone for whose acts Supplier may be liable.

14. Payments

Supplier's billing shall specify all sales or other taxes as a separate line item or must clearly state that no taxes are included and then only if previously agreed with PEPPER's Project Manager. Invoices must be in a form acceptable to PEPPER and shall indicate the original Purchase Order Price, all authorized Change Orders, the adjusted Purchase Order Price, amounts paid to date, the amount of current request, and all retainage. A Pending Change Request Log shall also be concurrently submitted to PEPPER, as set forth at Article 11, above.

In the event of Owner's nonpayment, nothing contained in this Agreement shall be construed as a waiver or impairment of Supplier's mechanic lien rights. When payment to Supplier is received from Owner, and provided the billing and insurance requirements have been met as required under this Purchase Order, all payments by PEPPER for Supplier's Work accepted by Owner shall be made in the net amount of its request within fifteen (15) business days of receipt of Owner's payment.

PEPPER shall make payments to Supplier in accordance with applicable law, including 371.405 of the Kentucky Revised Statutes.

Invoices must be accompanied by a Sworn Statement, if applicable, and Supplier's Waiver of Lien for all payments made to date and the invoice presented.

All billings to PEPPER for Materials delivered or Work completed will be done per the PEPPER billing procedures, which are further described within Article 23, below. All amounts to be billed must be approved before requisitions or billings are submitted.

15. Warranties

Supplier expressly warrants that all Materials purchased and delivered hereunder shall: 1) conform to the specifications, drawings, samples and other descriptions contained in the Contract Documents; 2) be merchantable in the trade as Materials strictly of the kind and quality described on the face hereof; 3) be of good quality and free from latent or patent defects; 4) be safe and fit for their intended purpose; and 5) conform to the specifications established on the face hereof. Inspection, acceptance or use of the Materials furnished hereunder shall not affect Supplier's obligations under this warranty, and all other express or implied warranties of Supplier, shall survive any such inspection, acceptance and use. Additionally, Supplier shall provide all warranties required under the Contract Documents. All warranties shall meet the express terms and conditions required under the provisions of the Contract Documents for the period called for in the Specifications or, if not specified, for twelve (12) months from acceptance of Project by Owner. Supplier shall promptly repair or replace any such defects occurring within the warranty period without cost or liability to PEPPER or Owner. All of Supplier's warranties shall run to PEPPER, its successors and assigns, and Supplier expressly permits PEPPER's assignment of its warranties to such persons. Notwithstanding any language in Supplier's forms, these warranties shall control insofar as the same may conflict with any warranty or limitations on warranty set forth in Supplier's forms. All express warranties contained herein are in addition to and not in limitation of any other express or implied warranties made or deemed made by Supplier. Supplier shall be liable for all expenses and damages, including but not limited to shipping, receiving and storage costs of PEPPER and all other incidental and consequential damages of PEPPER for any breach of warranty.

16. Indemnification

To the fullest extent permitted by law, Supplier agrees to protect, defend, hold harmless and indemnify PEPPER, its agents, servants, employees, officers and directors ("PEPPER Indemnitees") from and against first- and third-party claims, actions, liabilities, losses, costs and expenses arising out of any actual or alleged; 1) infringements of any patent, trademark or copyright; 2) death or any actual or alleged injury to any person; 3) damage to any property; or 4) any other damage or loss, resulting or claimed to result in whole or in part from any actual or alleged act or omission of Supplier or defects in any Materials sold to PEPPER hereunder, whether latent or patent, including actual or alleged improper construction or design of such Materials or the failure of such Materials to comply with specifications or with any express or implied warranties of Supplier or arising out of any actual or alleged violation by such Materials or its manufacture, possession, use or sale, of any law, statute or ordinance or any governmental or administrative order, rule or regulation. These agreements and obligations of the Supplier shall not be affected or limited in any way by PEPPER's extension of express or implied warranties to its customers. The foregoing agreement to indemnify and defend and hold PEPPER and PEPPER Indemnitees harmless, shall include indemnification for all fines, costs and expenses, including insurance deductibles and reasonable attorneys' fees, incurred by PEPPER and/or PEPPER Indemnitees in connection with or as a result of any such demand, action, suit, claim or proceeding, whether meritorious or not.

17. Payment Is Not Acceptance

Payment for Materials delivered hereunder shall not constitute acceptance of the Materials nor shall tender of payment be a condition to Supplier's duty to tender and complete any delivery required hereunder.

18. Delivery Delay, Damages

PEPPER shall not be liable for delaying delivery and/or acceptance of Materials. In no event shall PEPPER be liable for anticipated profits or for incidental or consequential damages of the Supplier. Such consequential damage include, without limitation, any charges or expenses for the storage, care or custody, resale, return, or transportation, related to delayed or cancelled delivery of Materials. Any action resulting from any breach on the part of PEPPER arising out of this Purchase Order must be commenced by the Supplier within one year after the cause of action has accrued.

19. Merger

This Purchase Order constitutes the entire agreement between PEPPER and Supplier. This Purchase Order is an integration of and supersedes any and all understandings, representations, proposals or negotiations between the Parties, whether oral or written. No oral agreements, representations, course of conduct or dealings between the parties or usage of trade shall be relevant to supplement, explain, contradict or vary in any way, any provision contained herein or any express or implied warranties of Supplier

20. Dispute Resolution

A. If arbitration of disputes is provided for in the Contract Documents, and if PEPPER, in its sole discretion, elects to demand arbitration with Supplier individually, or as part of joint proceedings with Owner or others, any dispute between PEPPER and Supplier involving or arising out of this Purchase Order, including breach thereof, shall be decided by arbitration as provided for in the Contract Documents. If PEPPER elects to demand arbitration with Supplier individually and subject to applicable law, such arbitration proceedings shall be held in Cincinnati, OH or such other place as PEPPER may designate.

B. If the Contract Documents do not provide for arbitration, and if PEPPER, in its sole discretion, elects to demand arbitration with Supplier individually, or as part of proceedings with Owner or other parties, any dispute arising between PEPPER and Supplier under this Purchase Order, including the breach thereof, shall be decided by Arbitration in accordance with the then current Construction Industry Arbitration Rules of the American Arbitration Association. The venue of such arbitration shall be Cincinnati, OH or such other place as PEPPER may designate. The award rendered by the arbitrator(s) shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

C. Supplier further agrees that, upon request by PEPPER, resolution of any dispute between PEPPER and Supplier may be consolidated with resolution of any dispute between Owner and PEPPER, whether in litigation or arbitration, at PEPPER's sole discretion, and that Supplier will join in and be bound by the result of any such dispute resolution process, even if such consolidation and/or joinder requires resolution of Supplier disputes in a forum not provided for in this Purchase Order and/or otherwise not selected by Supplier and even if Supplier is not permitted to become a named party to such proceeding or process. Supplier agrees not to institute (and to stay) legal remedies against PEPPER until all legal proceedings against Owner with respect to such claim are final and complete. Supplier hereby agrees to make no claim, and shall not be entitled, to further payment beyond the Purchase Order Price, other than to the extent that PEPPER may receive funds from Owner on behalf of Supplier, which funds shall be paid by PEPPER to Supplier less costs and expenses incurred by PEPPER in prosecuting such claims.

D. Notwithstanding any provision to the contrary, in any dispute involving Owner, PEPPER and Supplier or in any dispute in which PEPPER requests that Supplier be joined in a dispute with Owner, all disputes, including disputes between PEPPER and Supplier, shall be resolved under the law selected by the Owner Agreement.

21. Equal Employment Opportunity

A. Nondiscrimination, Affirmative Action and Federal Contract Compliance:

During the performance of this Purchase Order, the Supplier agrees as follows:

1) The Supplier will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Supplier will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Supplier agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

2) To supplement Paragraph 1 above (to the extent applicable and that additional requirements are proscribed in the following), pursuant to 41 C.F.R. Sections 60-1.4(d), 60-250.5(d), and 60-741.5(d), PEPPER incorporates by reference the provisions found at **41 C.F.R. Sections 60-1.4(a)(b),** 41 C.F.R. Section 60-4.3(a), **41 C.F.R. Section 60-250.5 and/or Section 60-300.5**, and **41 C.F.R. Section 60-741.5, Executive Order 13496 and 29 C.F.R. Part 471, Appendix A to Subpart A, if applicable**, into this Purchase Order. Supplier is hereby notified that it has an obligation to determine whether the Work it is performing, or the goods and services it is providing to PEPPER, are provided pursuant to a federal government contract or a federally assisted construction contract. If so, Supplier shall determine the extent to which the provisions of Executive Order 11246, the Vietnam Era Veterans' Readjustment Assistance Act of 1974, and Section 503 of the Rehabilitation Act of 1973, as amended, along with their respective implementing regulations found at 41 C.F.R. Part 60, apply to the terms of this specific Purchase Order and shall comply with such provisions. Note: federal construction suppliers or federally-assisted construction suppliers are advised to review the Department of Labor's, Office of Federal Contract Compliance Programs (OFCCP) Technical Assistance Guide for Federal Construction Contractors to understand the requirements for both federal contractors and suppliers.

3) The Supplier shall comply with all federal, state, and local equal employment and affirmative action statutes, rules and regulations including, to the extent applicable given the geographical location of the Project (and not in limitation of any other particular law that would pertain to the Supplier's Scope of Work), including but not limited to Chapter 344 of the Kentucky Revised Statutes, the Kentucky Civil Rights Act, any then-existing prevailing wage laws, if applicable, and any subsequent amendments to or regulations thereof.

B. Default

Violation of any anti-discrimination or affirmative action requirements, whether or not expressly described herein, that are lawfully imposed on the operation of the Supplier's business in the performance of the Scope of Work described herein, shall be a material breach of this Purchase Order.

22. Strict Compliance

Supplier is bound to strict compliance with this Purchase Order. PEPPER's failure to insist upon strict compliance with any of the provisions of this Agreement, or failure to exercise any options provided, shall not be construed as a waiver or an estoppel of PEPPER's right to thereafter require such strict compliance or to exercise such option.

23. BILLING PROCEDURES
PEPPER CONSTRUCTION COMPANY OF OHIO, LLC ACCOUNTING PACKAGE
SUPPLIER APPLICATION FOR PAYMENT AND PAYMENT CONDITIONS

The following terms and conditions are an integral part of Purchase Order for Material Agreement _____. Please direct any billing questions to PEPPER's Accountant for this Project, _____ at _____ and _____@pepperconstruction.com.

APPLICATION FOR PAYMENT

PEPPER CONSTRUCTION COMPANY OF OHIO, LLC IS ONLY ABLE TO PROCESS INVOICES THROUGH OUR ACCOUNTING SYSTEM AFTER OUR PURCHASE ORDER FOR MATERIAL HAS BEEN SIGNED WITHOUT ALTERATION AND RETURNED TO US, INCLUDING APPROPRIATE INSURANCE.

CHANGES TO SUPPLIER'S PURCHASE ORDER CANNOT BE BILLED UNTIL A FORMAL CHANGE ORDER HAS BEEN RECEIVED BY SUPPLIER FROM AN AUTHORIZED REPRESENTATIVE OF PEPPER CONSTRUCTION COMPANY OF OHIO, LLC AND EXECUTED BY BOTH SUPPLIER AND PEPPER. ONCE APPROVED, CHANGES SHOULD NOT BE SEPARATELY BILLED, BUT SHOULD BE INCLUDED IN SUPPLIER'S MONTHLY BILLING AT THE REVISED PURCHASE ORDER PRICE.

1. Given the requirements of the Owner Agreement, Applications for Payment for Materials provided and accepted by Owner, shall including the following:

   One (1) of each of the following documents:
   a) Application and Certificate for Payment signed and notarized (AIA G702);
   b) Schedule of Values (AIA G703) in format approved by PEPPER;
   c) Stored materials documentation, as required by Owner;
   d) Pending Change Request Log, submitted electronically, identifying outstanding Change Requests ("CRs"), as well as correlating CR date, description, dollar value and status of the Change Request, as further described at Article 11; and

   Three (3) of each of the following documents:
   e) Partial or Final Waivers of Lien as required, including waivers from all Material Suppliers and for further lower tiers upon request.

2. All invoice packages must be received no later than the 15th of the month for Work performed, as projected, from the first to the last day of the month. Invoice packages not received by this deadline WILL NOT be processed until the following month.

3. Unless PEPPER requires current Waivers of Lien, upon PEPPER's receipt of payment from the Owner, Supplier will be contacted with the correct information to be included in the Waiver. The Waiver form to be used shall be that attached hereto, unless otherwise specified by Owner. Copies of all Notices of Furnishing tendered to the Owner by a sub-subcontractor or supplier of any tier must also be provided to PEPPER.

4. Supplier shall, as often as requested by PEPPER, furnish such information, evidence, and substantiation as PEPPER may require with respect to the extent and value of the current progress of Supplier's Work. Supplier shall also furnish, upon request, similar detail regarding the nature and extent of all obligations incurred by Supplier in connection with the Work and all payments made by Supplier on account thereof.

5. Supplier shall also furnish, as required by PEPPER in its sole discretion, such partial or final lien waivers or releases as PEPPER deems necessary to ensure that Supplier has paid all parties furnishing any labor, material, or services in furtherance of any Work furnished hereunder. If required by PEPPER, the furnishing of such lien waivers and releases shall be a condition precedent to any payment hereunder. Moreover, no prior failure of PEPPER to require such releases and waivers shall limit PEPPER's right to subsequently require them.

6. Accordingly, Supplier is intended to assume the risk of Owner's non-payment under the circumstances set forth herein. Owner's payment to PEPPER is a condition precedent to PEPPER's obligation to pay Supplier. The only exception is when Owner's withholding of a PEPPER payment is solely due to a failure by PEPPER to perform any of its obligations under the Owner Agreement that are unrelated to this Purchase Order Agreement.

7. If payment to PEPPER is received from Owner, and provided the billing and insurance requirements have been met as required under this Purchase Order for Material, all payments by PEPPER on Supplier's Work accepted by Owner shall be made in the net amount of its request within fifteen (15) business days of receipt of Owner's payment.

8. At the time the Final Waiver is required, it shall be in the full amount of the adjusted Purchase Order Price.

9. Retainage shall be held in accord with the Contract Documents between Owner and PEPPER and paid to Supplier after approval and acceptance by Owner and upon payment by Owner to PEPPER.

10. In the event Supplier suffers financial distress as described in Article 6, above, PEPPER shall, in its sole and absolute discretion, have the right but not the obligation to pay sub-suppliers directly or tender payment jointly to Supplier and lower tiers.

PEPPER CONSTRUCTION COMPANY OF OHIO

SUBCONTRACTOR / SUPPLIER WAIVER OF LIEN RIGHTS AND ACKNOWLEDGMENT OF PARTIAL PAYMENT

TO ALL WHOM IT MAY CONCERN:

In consideration for the payment received, the receipt of which is hereby acknowledged, the undersigned Subcontractor or Supplier does hereby waive and relinquish all rights of lien or claim that it may have either in law or equity (including but not limited to rights under Kentucky Mechanics' Lien Laws, KRS 376.010 *et seq*.) with respect to the construction project known as _____ ("the Project"), and the real property located at _____on which the Project is located, for all labor, equipment, and/or materials provided to or on behalf of the Project through _____, 20___.

The Undersigned acknowledges and agrees that such payment represents payment in full for all such labor, equipment and/or materials (subject to any previously agreed to retainage) and that the Subcontractor or Supplier anticipates providing or may have already provided additional labor, equipment, and/or materials, subsequent to the above date, which are not covered by this Waiver of Lien Rights and Acknowledgment of Partial Payment.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights and Acknowledgment of Partial Payment to be executed by its authorized representative as of the date indicated below.

THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO SO.

SUBCONTRACTOR OR SUPPLIER:

_____
(Print name of Subcontractor or Supplier)

By: _____
(Printed name)

_____
(Signature)

Its: _____
(Title)

State of Kentucky:
County of _____: ss,

Sworn to and subscribed before me this _____ day of _____, 202__

_____
NOTARY PUBLIC

My Commission Expires: _____

PEPPER CONSTRUCTION COMPANY OF OHIO

SUBCONTRACTOR / SUPPLIER WAIVER OF LIEN RIGHTS
AND ACKNOWLEDGMENT OF FINAL PAYMENT INCLUDING ANY RETAINAGE

TO ALL WHOM IT MAY CONCERN:

In consideration for payment received, the receipt of which is hereby acknowledged, the undersigned Subcontractor or Supplier does hereby waive and relinquish all rights of lien or claim that it may have either in law or equity (including but not limited to rights under Kentucky Mechanics' Lien Laws, KRS 376.010 *et seq*.) with respect to the construction project known as _____ ("the Project"), and the real property located at _____ on which the Project is located, for all labor, all equipment, and/or materials provided to or on behalf of the Project throughout its entirety.

The Undersigned acknowledges and agrees that such payment represents final payment in full for all such labor, equipment and/or materials including retainage, if any, and that the Subcontractor or Supplier has completed its work on the Project.

IN WITNESS WHEREOF, the undersigned has caused this Waiver of Lien Rights and Acknowledgment of Final Payment to be executed by its authorized representative as of the date indicated below.

THE INDIVIDUAL SIGNING THIS LIEN WAIVER REPRESENTS THAT HE OR SHE IS AUTHORIZED TO DO SO.

SUBCONTRACTOR OR SUPPLIER:

_____
(Print name of Subcontractor or Supplier)

By: _____
(Printed name)

_____
(Signature)

Its: _____
(Title)

State of Kentucky:
County of _____: ss,

Sworn to and subscribed before me this _____ day of _____, 202__

_____
NOTARY PUBLIC

My Commission Expires: _____

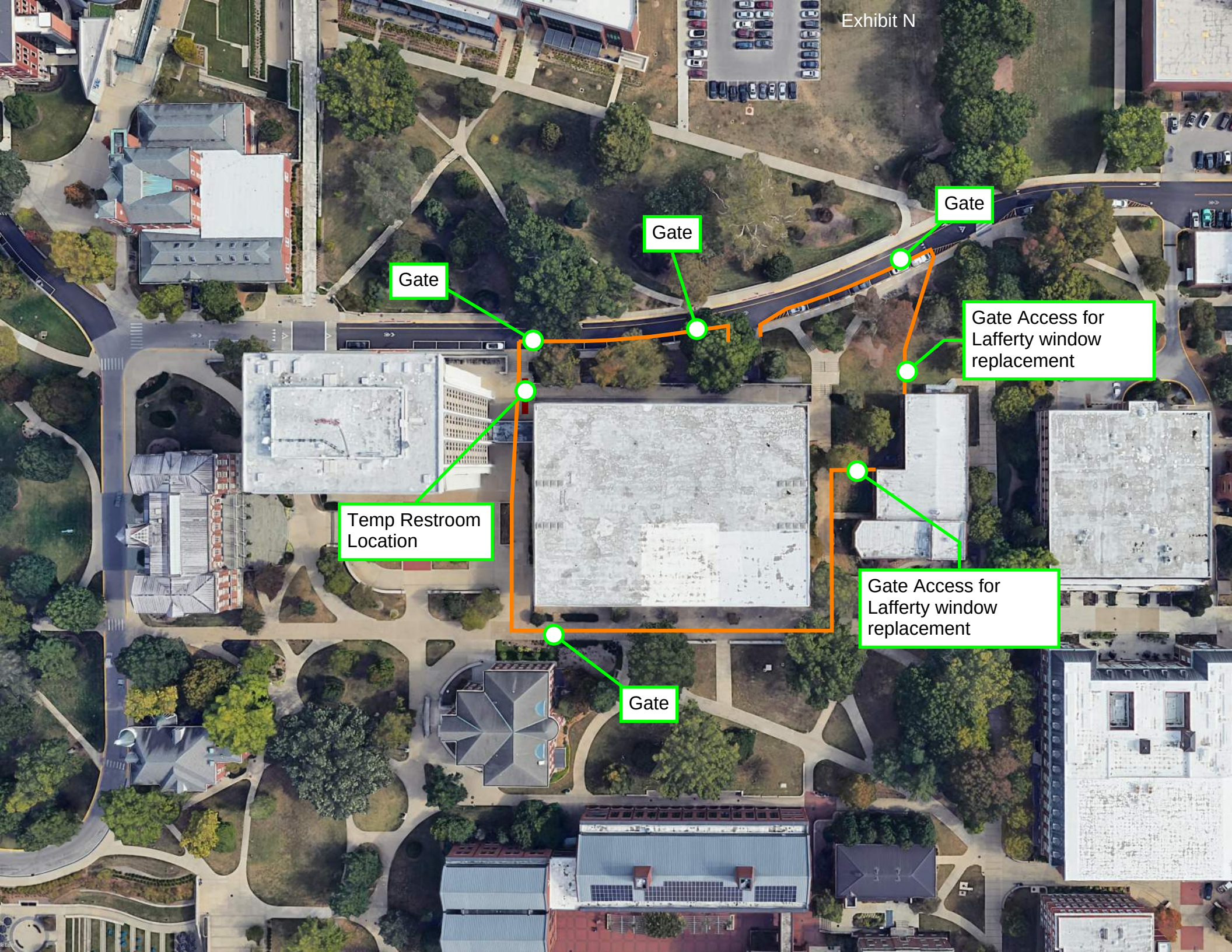


Exhibit N
Gate
Gate
Gate
Gate Access for Lafferty window replacement
Temp Restroom Location
Gate Access for Lafferty window replacement
Gate

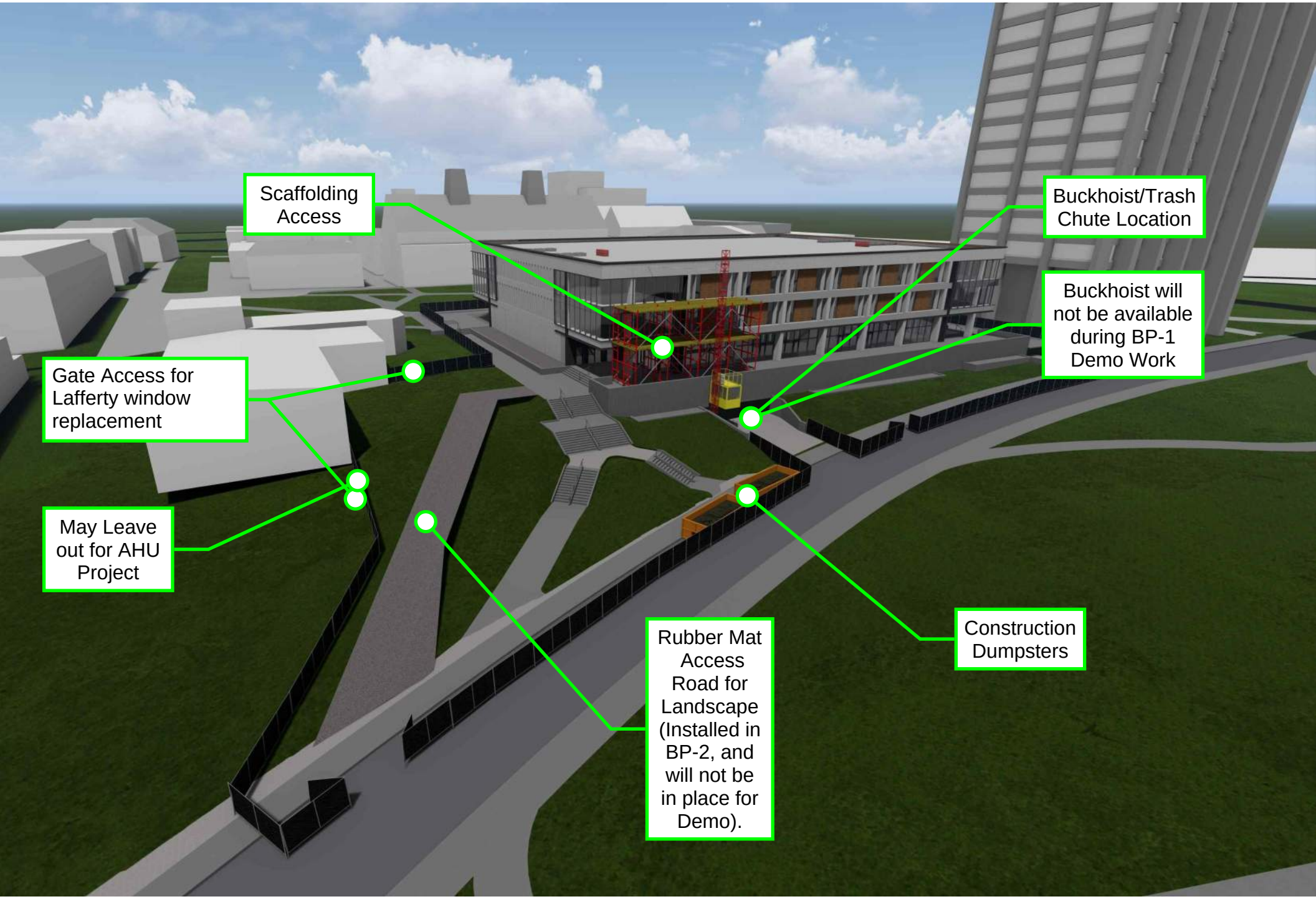

Scaffolding Access
Buckhoist/Trash Chute Location
Buckhoist will not be available during BP-1 Demo Work
Gate Access for Lafferty window replacement
May Leave out for AHU Project
Rubber Mat Access Road for Landscape (Installed in BP-2, and will not be in place for Demo).
Construction Dumpsters

Exhibit O

Tobacco-Free UK:
A Healthy Place to Live, Work and Learn

Frequently Asked Questions: Contractors and Vendors University of Kentucky's Tobacco-free Policy

- **When did the tobacco-free policy go into effect?**
  November 19, 2009 in conjunction with the American Cancer Society's Great American SmokeOut.

- **What does tobacco-free mean?**
  Smoking or use of any tobacco product is not permitted in any building, facility or on the grounds of the University of Kentucky.

- **Who is affected by this policy?**
  The policy applies to every person who comes to the University of Kentucky campus, including visitors, contractors, service representatives, faculty, staff, volunteers, students, and alumni.

- **What tobacco products are prohibited by this policy?**
  Tobacco products include, but are not limited to, cigarettes, electronic cigarettes (e-cigarettes, vape pens, e-pens), chew, pipes, cigars, hookah or waterpipe smoking, snuff, and snus.

- **What areas of the University of Kentucky campus are included in the policy?**
  The entire University of Kentucky campus and Fayette County properties are included. This includes all owned, operated, leased, occupied, or controlled University buildings and structures, grounds, parking structures, enclosed bridges and walkways, sidewalks, streets, parking lots, and vehicles, as well as personal vehicles in these areas.

- **Can I use tobacco products in the parking garages or shuttles?**
  No. The policy prohibits use of tobacco products in all University of Kentucky parking structures, parking lots, or shuttles serving the University of Kentucky.

- **Can I use tobacco in my personal vehicle?**
  No. Tobacco use is prohibited in personal vehicles while they are on UK's property including in all parking areas, both inside and outside of vehicles.

- **What about streets and sidewalks not owned by University of Kentucky?**
  For those sidewalks adjacent to streets not controlled by the University, we ask that individuals respect the pedestrians and our efforts to provide a healthier environment by refraining from tobacco use on those sidewalks. University of Kentucky boundaries can be found on the map on our website.

UNIVERSITY OF KENTUCKY seeblue.

Tobacco-Free UK:
A Healthy Place to Live, Work and Learn

- **Do employees, students, and contractors have to quit using tobacco?**
  No. The university is not asking anyone to quit. This policy simply means that no one can use tobacco products on the University of Kentucky campus. To alleviate common cravings and to feel more comfortable while on campus, tobacco users may purchase nicotine gum and/or patches at low cost at University of Kentucky convenience stores, pharmacies, and hospital gift shops.

- **Are other universities tobacco-free?**
  Yes. As of July 2014, there are 1,372 other United States colleges and universities with tobacco-free or smoke-free policies covering the entire campus, indoors and out.

- **Why are there not designated smoking areas on campus?**
  The goal is to make University of Kentucky a healthy place to live, work and learn. Designated areas don't support the goal of the policy: to promote a healthy environment.

- **What is the main reason for the tobacco-free policy at UK?**
  The University of Kentucky has a vital interest in maintaining a safe and healthy environment for our students, employees, patients and visitors. Science is clear: the use of tobacco products constitutes a significant health hazard. Smoking is the single most preventable cause of death in the U.S. In addition, Kentucky spends over $1 billion per year treating people who get sick from using tobacco products.

- **How can UK justify prohibiting smokeless tobacco when it does not give off secondhand smoke?**
  Smokeless tobacco products are harmful and are not a safe alternative to smoking. All tobacco users face health-related injuries and preventable diseases (i.e., oral cancers). More than $1 billion per year is spent on treating people who get sick from using tobacco products in Kentucky. The use of tobacco products leads to premature death and chronic, debilitating disease, and UK is taking the lead on creating a healthier Kentucky.

- **What do I do if I see someone violating the tobacco-free policy?**
  University of Kentucky believes compliance is everyone's business. If comfortable doing so, you can approach the violator in a kind, compassionate way. You might say, *"Hello, my name is ____, and I am an (employee, student, contractor) here at UK. Are you aware that UK's campus is tobacco-free? I ask you to please respect others on campus and put your cigarette out (or other tobacco product) and dispose of it in a trash can."*

  You can also report violations to our tobacco-free report line via the website or you can send an email with details of the violation (i.e., date, time, location, name/details of the violator) to ReportTFviolation@uky.edu For more information on the policy Implementation Guidelines, visit the website.

- **What is the University of Kentucky doing to help employees who want to quit using tobacco products?**
  Employees and spouses or sponsored dependents have a comprehensive prescription benefit, Health and Wellness programs for tobacco treatment, and counseling on quitting tobacco. Over-the-counter and prescription products are available at Kentucky Clinic Pharmacy (employees may also use the University Health Service pharmacy). Employees may take advantage of their health care spending account for additional tax savings on over-the-counter products used for tobacco treatment such as lozenges, nicotine patches, or gum. Specific information on employee resources can be found at www.uky.edu/TobaccoFree.

- **I am interested in quitting tobacco, but am not an employee or student at the University of Kentucky. What resources are available to me?**
  The University of Kentucky values the health and well-being of everyone who uses our facilities. If you use tobacco products and would like to quit, discuss with your physician or other health care provider which approach may work best for you. Specific resources available to the general public are available at www.uky.edu/TobaccoFree.

- **I am not ready to quit using tobacco, but I want to be comfortable while on campus. What resources are available to me?**
  The University of Kentucky understands not everyone is ready to quit using tobacco. Low cost nicotine replacement gum may be purchased in campus convenience stores, gift shops and pharmacies. Find out more on the website www.uky.edu/TobaccoFree.

Report violations of UK's Tobacco-free policy to: ReportTFviolation@uky.edu

Learn about UK's Tobacco-free Policy and available tobacco treatment resources:
http://www.uky.edu/TobaccoFree/

University of Kentucky

TOBACCO-FREE CAMPUS

Tobacco-Free Policy

This policy covers all University-controlled streets and sidewalks. For those sidewalks adjacent to streets not controlled by the University, we ask that you respect the pedestrians and our efforts to provide a healthier environment by refraining from tobacco use on those sidewalks.

http://www.uky.edu/TobaccoFree

Created by the University of Kentucky Physical Plant Division REV: 20091117

FORM 646 REV 02/20/09

PERFORMANCE BOND

Bond # _____

KNOW ALL MEN BY THESE PRESENTS; that _____
(Name of Subcontractor)
_____ a _____ corporation with principal offices located at

_____ as Principal
(Address)
(hereinafter "Principal") and _____ as
(Name of Surety)
Surety, a _____ corporation with offices located at _____
(Address)
_____ (hereinafter "Surety"), are held and firmly bound

until _____ (hereinafter
(Name of Construction Manager)
"Obligee"), in the sum of _____ Dollars ($) for the payment whereof the Principal and Surety bind themselves, and their respective heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a Subcontract with Obligee for the performance of _____
_____ (hereinafter the "Subcontract Work"), for and at the
(Subcontract Work)

_____
(Project Name)
(hereinafter the "Project") located at _____
(Address)
in accordance with Drawings and Specifications prepared by _____

_____
(Architect/Engineer)
which Subcontract is by reference made a part hereof, and is hereinafter referred to as the "Subcontract."

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully perform said Subcontract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by Obligee.

Whenever Principal shall be and declared by Obligee to be in default under the Subcontract, Obligee having performed Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

1) Complete the Subcontract in accordance with its terms and conditions; or

2) Obtain a bid or bids for completing the Subcontract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or if Obligee elects, upon determination by Obligee and the Surety jointly of the lowest responsible bidder, arrange for a subcontract between such bidder and Obligee, and make available as Subcontract Work progresses (even though there should be a default or a succession of defaults under the subcontract or subcontracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Subcontract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Subcontract price," as used in this paragraph, shall mean the total amount payable by Obligee to Principal under the Subcontract and any amendments thereto, less the amount properly paid by Obligee to Principal.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than Obligee or the heirs, executors, administrators or successors of Obligee.

IN WITNESS WHEREOF, the Principal and Surety have hereunto caused this Bond to be duly executed and acknowledged as set forth below this _____ day of _____, 20____.

(Impress Corporate Seal) _____, Principal
(Name of Subcontractor/Principal)

ATTEST:

By: _____
(Officer)

Title:_____

(Impress Corporate Seal) _____, Surety
(Name of Surety)

ATTEST:

By: _____
(Attorney-in-Fact)

NOTE: An original Power of Attorney bearing same date as Bond must be attached.

ACKNOWLEDGMENT

State of: _____

County of: _____

On this _____ day of _____, 20___, before me appeared _____ _____, to me known, who being by me duly sworn, did depose and say that he resided in _____; that he is the _____ (Officer) of the corporation described in and which executed the foregoing PERFORMANCE BOND (hereinafter "Instrument") as Subcontractor/Principal; that he knew the seal of said corporation; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; and that the foregoing instrument was signed, sealed and delivered to him on behalf of said corporation by its authority duly given as the voluntary act and deed of said corporation.

IN WITNESS WHEREOF, the said _____ (Name of Officer) has subscribed and sworn to the foregoing oaths before me, and I have hereunto set my hand and affixed my official seal the day and year first above written.

(SEAL)

_____
Notary Public

My Commission Expires: _____

Revised 02/20/09

FORM 647 Rev. 02/20/09

LABOR and MATERIAL PAYMENT BOND

Bond # _____

KNOW ALL MEN BY THESE PRESENTS; that _____
(Name of Subcontractor)
_____ a _____ corporation with principal offices located at

_____ as Principal
(Address)
(hereinafter "Principal") and _____ as
(Name of Surety)
Surety, a _____ corporation with offices located at _____
(Address)
_____ (hereinafter "Surety"), are held and firmly bound

unto _____ (hereinafter
(Name of Construction Manager)
"Obligee"), in the sum of _____ Dollars ($) for the payment whereof the Principal and Surety bind themselves, and their respective heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a Subcontract with Obligee for the performance of _____
_____ (hereinafter the "Subcontract
(Subcontract Work)
Work"), for and at the _____
(Project Name)
(hereinafter the "Project") located at _____
(Address)
in accordance with Drawings and Specifications prepared by _____
_____
(Architect/Engineer)
which Subcontract is by reference made a part hereof, and is hereinafter referred to as the "Subcontract."

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Subcontract, then this obligation shall be void: otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1) A Claimant is defined as one having a direct contract with the Principal or with a subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Subcontract, labor and material being construed to include that

part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment directly applicable to the Subcontract.

2) The above named Principal and Surety hereby jointly and severally agree with the Obligee that every Claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's work or labor was done or performed, or materials were furnished by such Claimant, may sue on this bond for the use of such Claimant, prosecute the suit to final judgment for such sum or sums as may be justly due Claimant, and have execution thereon. The Obligee shall not be liable for the payment of any costs or expenses of any such suit.

3) No suit or action shall be commenced hereunder by any Claimant:

a) Unless Claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Obligee, or the Surety above named, within ninety (90) days after such Claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Obligee or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which the Principal ceased performing Subcontract Work, it being understood, however, that if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4) The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanic's liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this Bond.

IN WITNESS WHEREOF, the Principal and Surety have hereunto caused this Bond to be duly executed and acknowledged as set forth below this _____ day of _____, 20____.

(Impress Corporate Seal) _____, Principal
(Name of Subcontractor/Principal)

ATTEST:

By: _____
(Officer)

Title:_____

(Impress Corporate Seal) _____, Surety
(Name of Surety)

ATTEST:

By: _____
(Attorney-in-Fact)

NOTE: An original Power of Attorney bearing same date as Bond must be attached.

ACKNOWLEDGMENT

State of: _____
County of: _____

On this _____ day of _____, 20___, before me appeared _____
_____, to me known, who being by me duly sworn, did depose and say that he resided in _____; that he is the _____ (Officer) of the corporation described in and which executed the foregoing LABOR and MATERIAL PAYMENT BOND (hereinafter "Instrument") as Subcontractor/Principal; that he knew the seal of said corporation; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; and that the foregoing instrument was signed, sealed and delivered to him on behalf of said corporation by its authority duly given as the voluntary act and deed of said corporation.

IN WITNESS WHEREOF, the said _____ (Name of Officer) has subscribed and sworn to the foregoing oaths before me, and I have hereunto set my hand and affixed my official seal the day and year first above written.

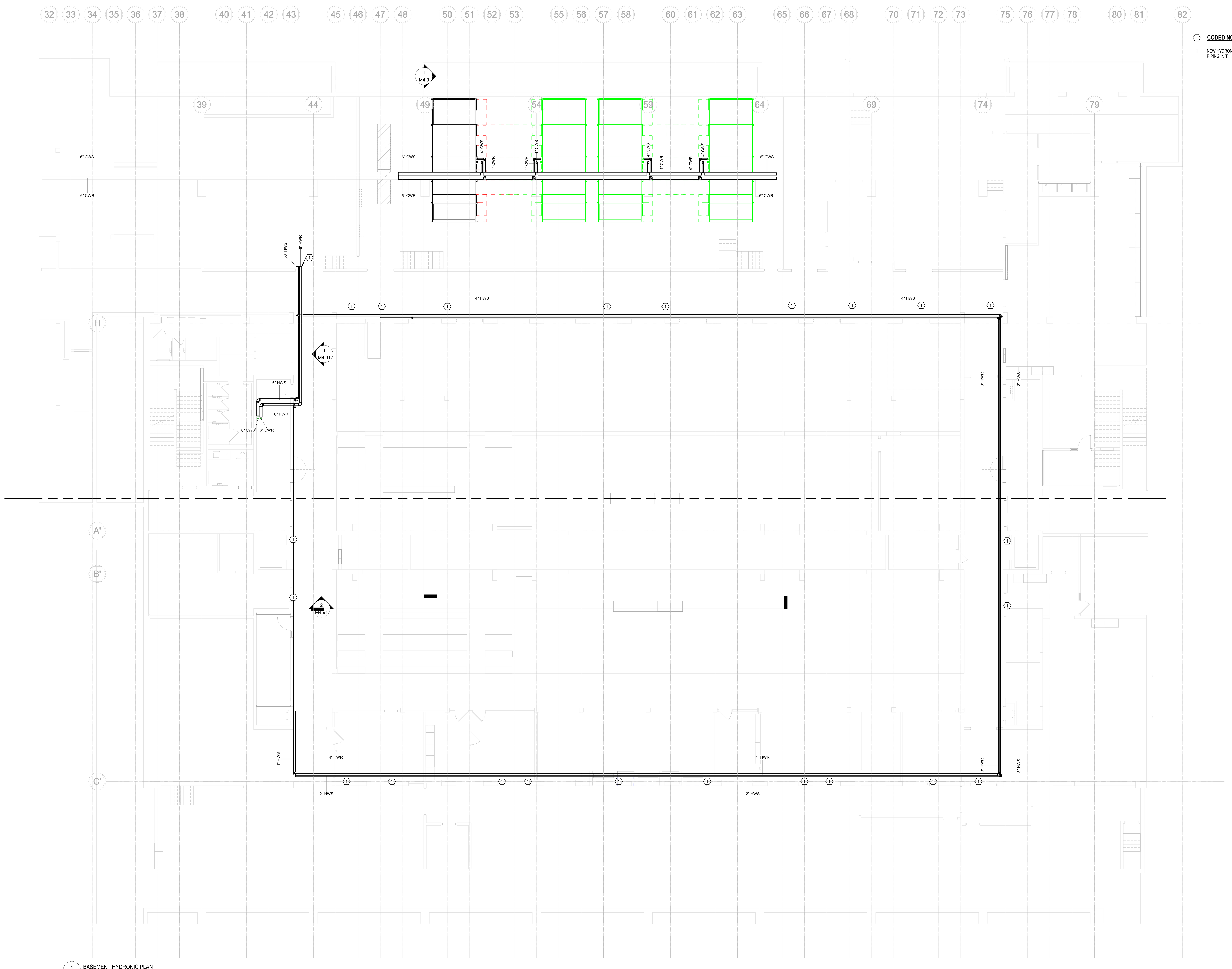
(SEAL)

_____
Notary Public

My Commission Expires: _____

Revised 02/20/09

MECHANICAL	
M3.0	BASEMENT HYDRONIC PLAN
M4.0	BASEMENT HVAC PLAN
M4.9	SECTION HVAC PLANS
M4.91	SECTION HVAC PLANS
M5.0	ROOF MECHANICAL PLAN
M6.3	AIRFLOW DIAGRAMS
M6.4	HYDRONIC FLOW DIAGRAMS
M7.0	MECHANICAL DETAILS
M7.1	MECHANICAL DETAILS
IC	
IC2.01	GROUND FLOOR
IC3.50	SYSTEM ARCHITECTURE RISER
IC3.51	GROUND FLOOR ARCHITECTURE
IC3.52	GROUND FLOOR ARCHITECTURE
IC3.53	GROUND FLOOR ARCHITECTURE
IC6.04	CHILLED WATER SYSTEM
IC6.07	AHU-1
IC6.08	AHU-1 BILL OF MATERIALS AND POINTS
IC6.09	AHU-1
IC6.10	AHU-2 BILL OF MATERIALS AND POINTS
IC6.11	AHU-1
IC6.12	AHU-3 BILL OF MATERIALS AND POINTS
IC6.13	AHU-1
IC6.14	AHU-4 BILL OF MATERIALS AND POINTS
IC7.01	CBR_0025_00_OB23_CHW CONTROL PANEL DETAILS
IC7.02	CBR_0025_00_0053_AHU1 CONTROL PANEL DETAILS
IC7.03	CBR_0025_00_0053_AHU2 CONTROL PANEL DETAILS
IC7.04	CBR_0025_00_0053_AHU3 CONTROL PANEL DETAILS
IC7.05	CBR_0025_00_0053_AHU4 CONTROL PANEL DETAILS
ELECTRICAL	
E8.0	ELECTRICAL PANEL SCHEDULES



CODED NOTES:

1 NEW HYDRONIC PIPING TO TIE INTO EXISTING PIPING IN THIS APPROXIMATE LOCATION.

1 / M3.0 BASEMENT HYDRONIC PLAN
1/8" = 1'-0"

NOTE:

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140 Patterson Dr, Lexington, KY 40506

BASEMENT HYDRONIC PLAN

JOB NO.	2302
DATE	7/22/2024
DRAWN	RJS
CHECKED	DHB

REVISIONS

No.	Description	Date

SHEET

M3.0

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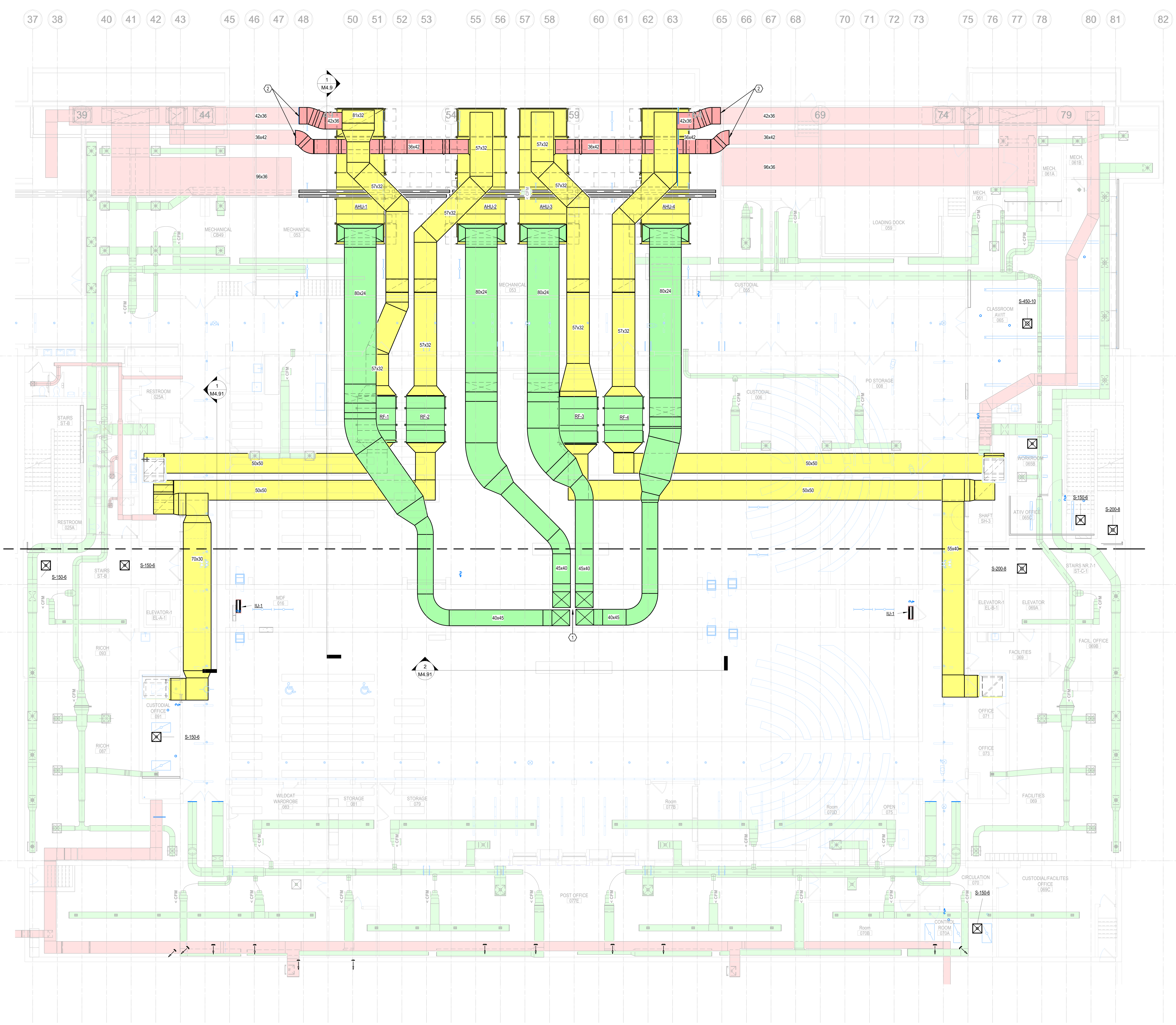

1 / M4.0 BASEMENT HVAC PLAN
1/8" = 1'-0"

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CODED NOTES:

1 ALL FOUR AHU SUPPLY MAINS TO ROUTE UP FIRE RATED CENTRAL SPINE CHASE IN THE MIDDLE OF THE BUILDING.

2 TIE NEW EXHAUST DUCTWORK INTO EXISTING IN THIS APPROXIMATE LOCATION. NEW MOTORIZED CONTROL DAMPERS TO BE PLACED BETWEEN THIS CONNECTION AND THE TAP INTO THE NEW RETURN DUCT.

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BASEMENT HVAC PLAN

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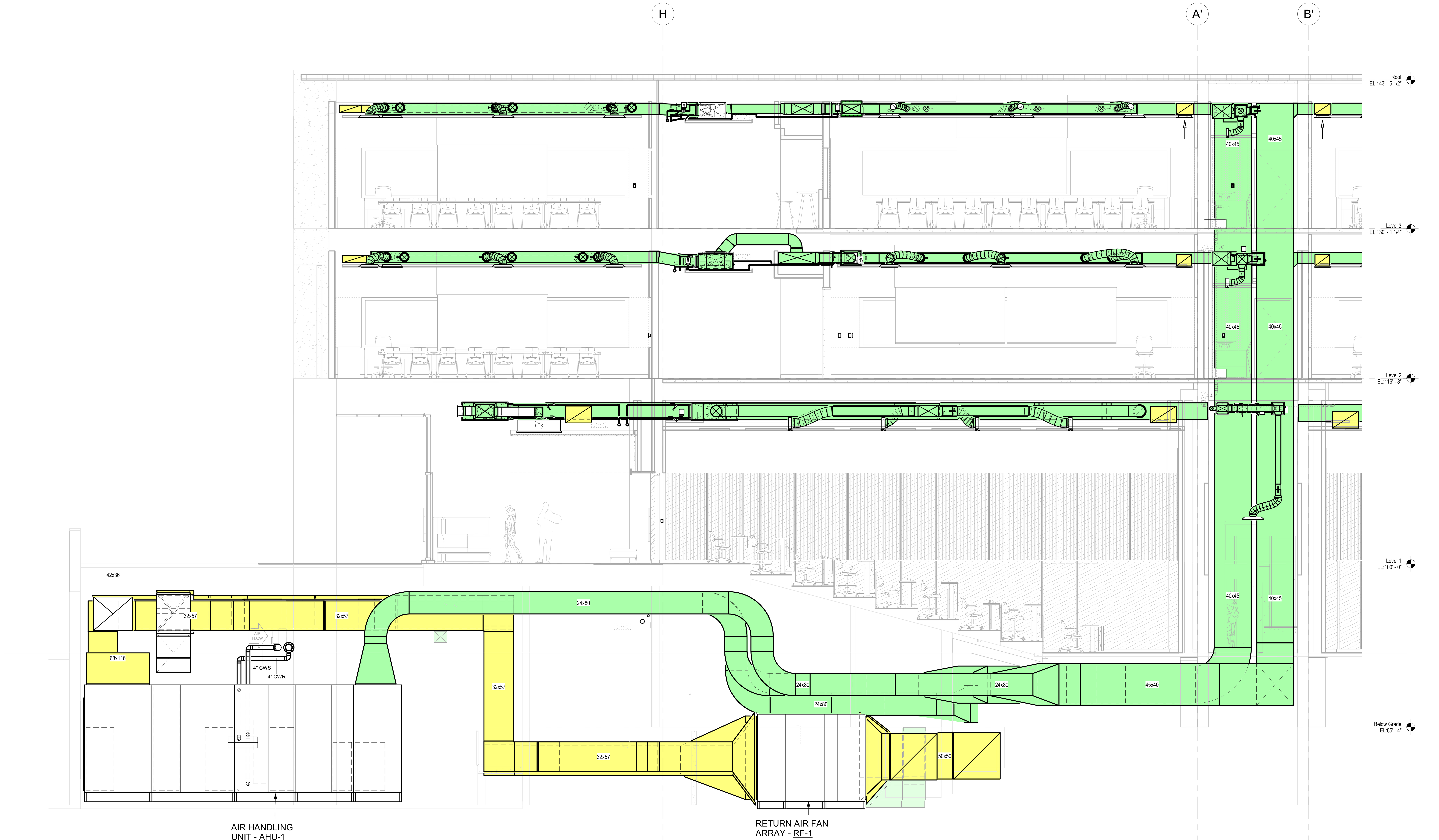

1 M4.9 Section 22
1/4" = 1'-0"

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SECTION HVAC PLANS

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M4.9

AIR HANDLING UNIT & RETURN FAN UNIT

Unit

Tag	Qty	Model	Length (in)	Weight (lb)	External Dimensions* Supply Height (in)	External Dimensions* Supply Width (in)
AHU-1,2,3,4	1	CAH080GDHM	346	14060.6	116	120
RF-1,2,3,4	1	CAH049GVHM	116	4514.35	94	96

Supply Fan

Tag	Fan Type	Fan Qty	Fan Class	Fan Airflow (CFM)	Fan RPM	Fan BHP	Fan E.S.P. (inH2O)	Fan T.S.P. (inH2O)	Motor Voltage	Motor Power (HP)	Motor RPM	Motor Control
AHU-1,2,3,4	DDPL18-9BL	4	2	8750	3238	12.77	3.5	5.71	460/60/3	20	3500	Grouped MMP J-Box
RF-1,2,3,4	DDPL22-9BL	4	2	7500	1549	3.81	2	2.01	460/60/3	5	1750	Grouped MMP J-Box

Chilled Water Coil

Tag	Sensible Capacity (Btu/hr)	Total Capacity (Btu/hr)	EAT-DB °F	EAT-WB °F	LAT-DB °F	LAT-WB °F	F.V. (ft/min)	A.P.D. (inH2O)	EWT °F	LWT °F	Flow Rate (GPM)	W.P.D. (ftH2O)	Rows	FPI
AHU-1,2,3,4	1025231	1560822	80	67	52.3	52.1	462	0.97	45	60.3	204.5	14.9	8	12
RF-1,2,3,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Panel Filter

Tag	Filter	Type	Filter Qty - Sizes	Depth	Efficiency	Clean PD (inH2O)	Dirty PD (inH2O)	Mean PD (inH2O)
AHU-1,2,3,4	Angled panel	Pre Pleat (MERV 13)	6 - 24.00 x 12.00 24 - 24.00 x 24.00	2	MERV 13	0.21	1	0.6
RF-1,2,3,4	-	-	-	-	-	-	-	-

GENERAL REMARKS:

*NOTE, EXTERNAL DIMENSION VALUES DO NOT INCLUDE BASE RAILS, COIL CONNECTORS, DRAIN CONNECTORS AND/OR CONTROL BOXES.

1. ALL AHU'S AND RF'S ARE TO BE CUSTOM KNOCKDOWN UNITS. UNIT MUST FIT THROUGH OPENINGS PROVIDED. COORDINATE WITH CONSTRUCTION MANAGER.

2. AHU-1,2,3,4: UNIT TO BE PROVIDED WITH MIXING BOX WITH ECONOMIZER, PANEL FILTERS, AIR BLENDER (SEE DETAIL 1 ON M6.3), SUPPLY FANS, SUPPLY SOUND TRAPS, COOLING COILS, AND DISCHARGE PLENUM.

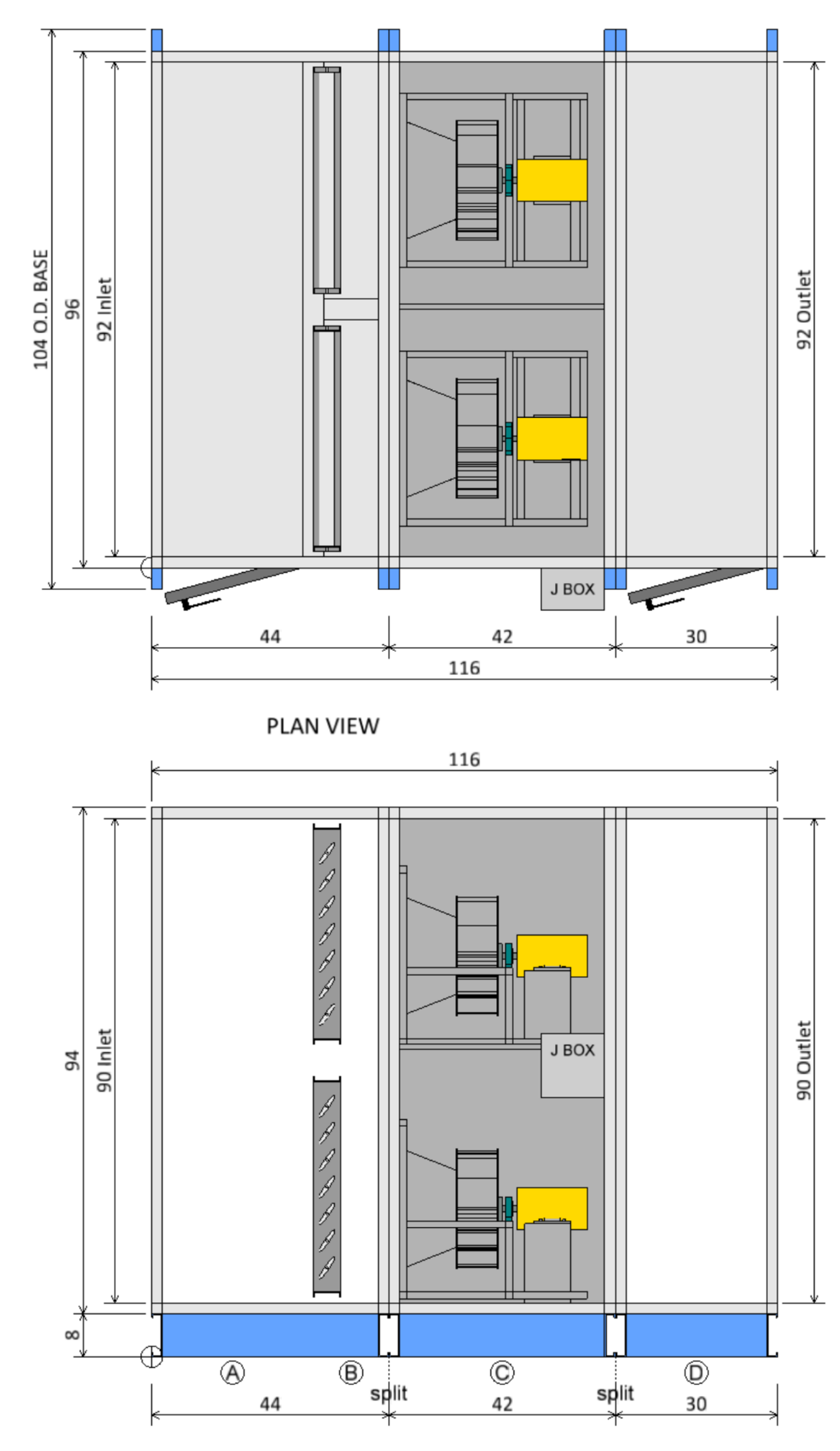
   RF-1,2,3,4: UNIT TO BE PROVIDED WITH RETURN SOUND TRAPS AND RETURN FANS.

3. AHU-1,2,3,4: MERV 13 PLEATED FILTER RACK. 6-24X12 AND 24-24X24 FILTERS. PROVIDE MAGNEHELIC ACROSS FILTER RACK.

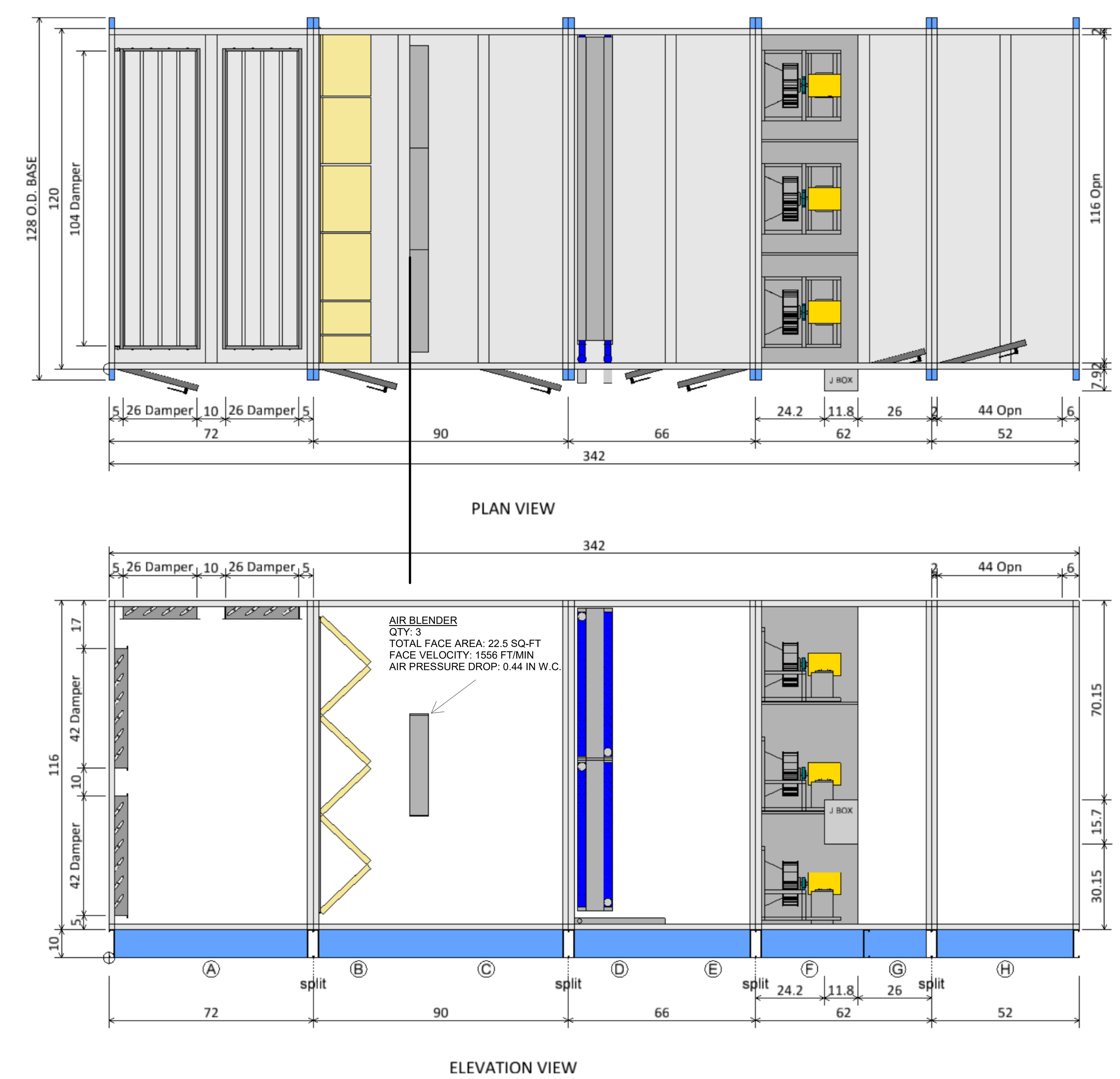
4. AHU-1,2,3,4: SUPPLY OUTLET SOUND POWER LEVELS: 63/90, 125/83, 250/85, 500/94, 1000/95, 2000/88, 4000/88, 8000/81.
   RETURN INLET SOUND POWER LEVELS: 63/85, 125/78, 250/81, 500/90, 1000/79, 2000/76, 4000/74, 8000/63.

   RF-1,2,3,4: SUPPLY OUTLET SOUND POWER LEVELS: 63/86, 125/78, 250/91, 500/85, 1000/85, 2000/86, 4000/84, 8000/74.
   RETURN INLET SOUND POWER LEVELS: 63/83, 125/88, 250/95, 500/90, 1000/84, 2000/82, 4000/76, 8000/68.

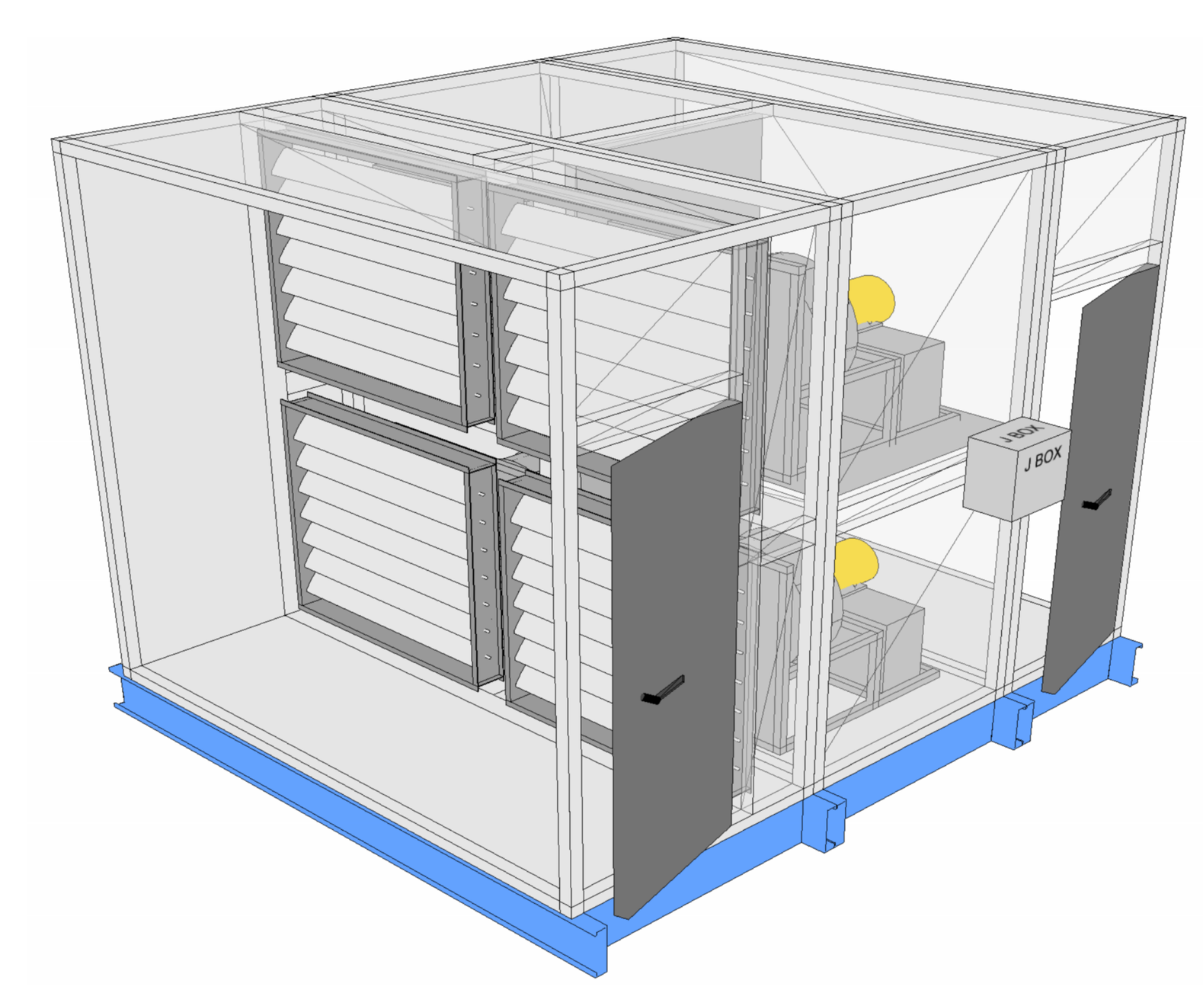
5. CHILLED WATER COILS: 2 COILS PER AHU, 51" HIGH, 107" LONG, 3" CONNECTIONS. BOLT OFF TO BE REMOVED THROUGH PLENUM DOOR. STAINLESS STEEL HEADERS, 0.01" FINS, 0.035" TUBES. PROVIDE WITH MISTOP MIST ELIMINATOR.



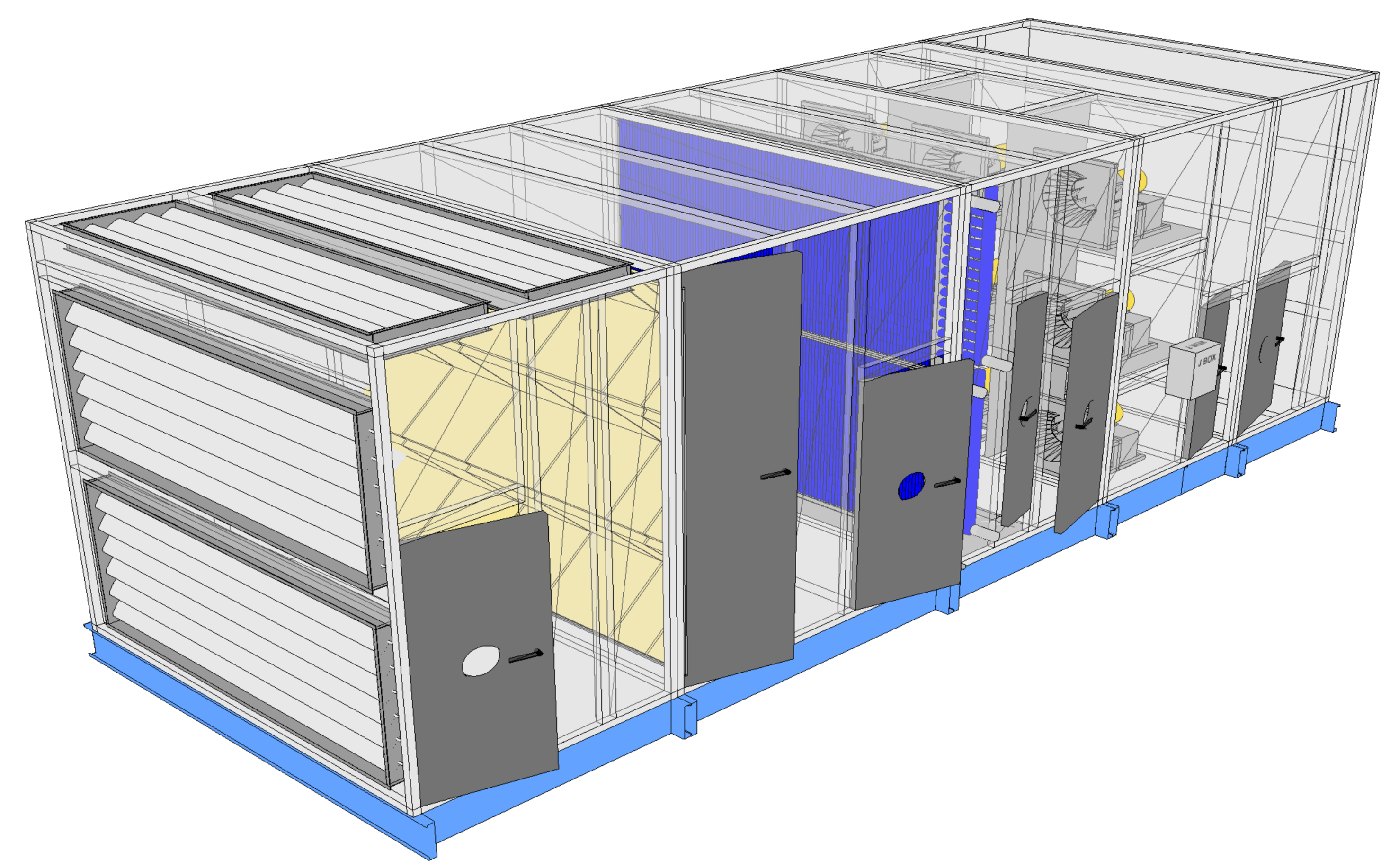
3 M6.3 RETURN FAN 1-4 PLAN AND ELEVATION
3/8" = 1'-0"



1 M6.3 AHU1-4 PLAN AND ELEVATION
3/8" = 1'-0"



4 M6.3 RETURN FAN 1-4 3D
3/8" = 1'-0"



2 M6.3 AHU1-4 3D
NOT TO SCALE

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AIRFLOW DIAGRAMS

JOB NO.	2302
DATE	7/22/2024
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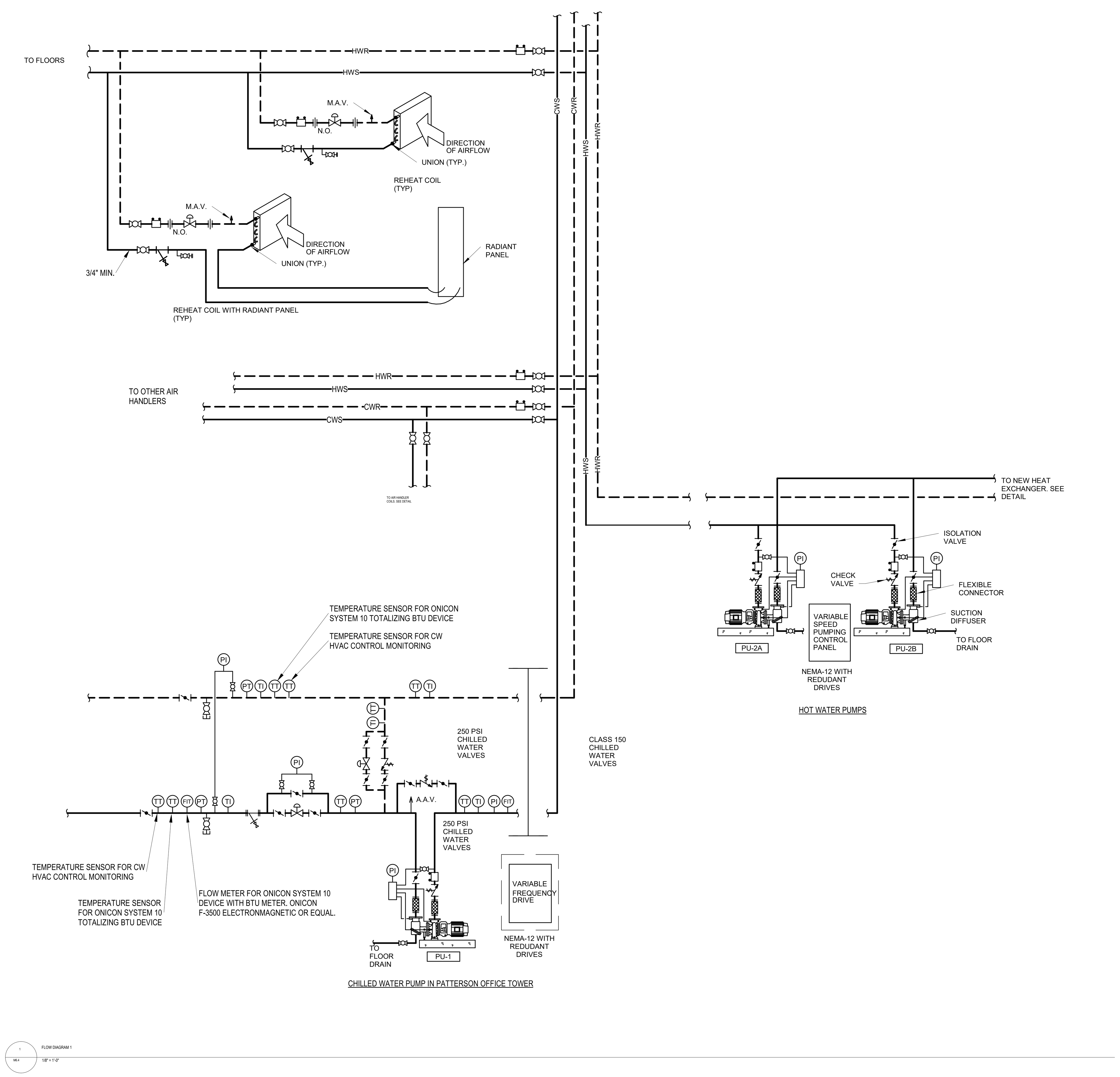
REVISIONS

No.	Description	Date

SHEET
M6.3



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HYDRONIC FLOW DIAGRAMS

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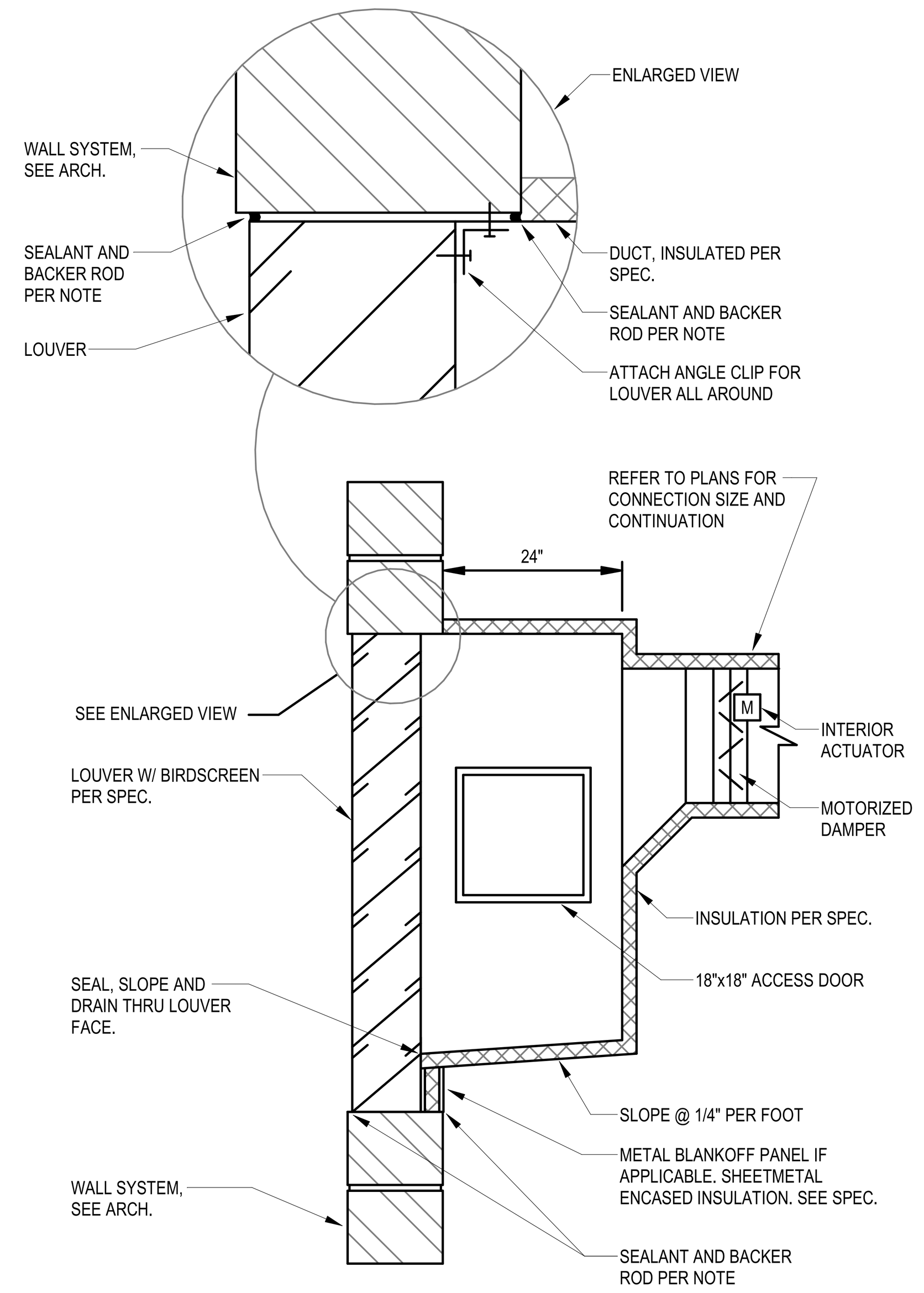
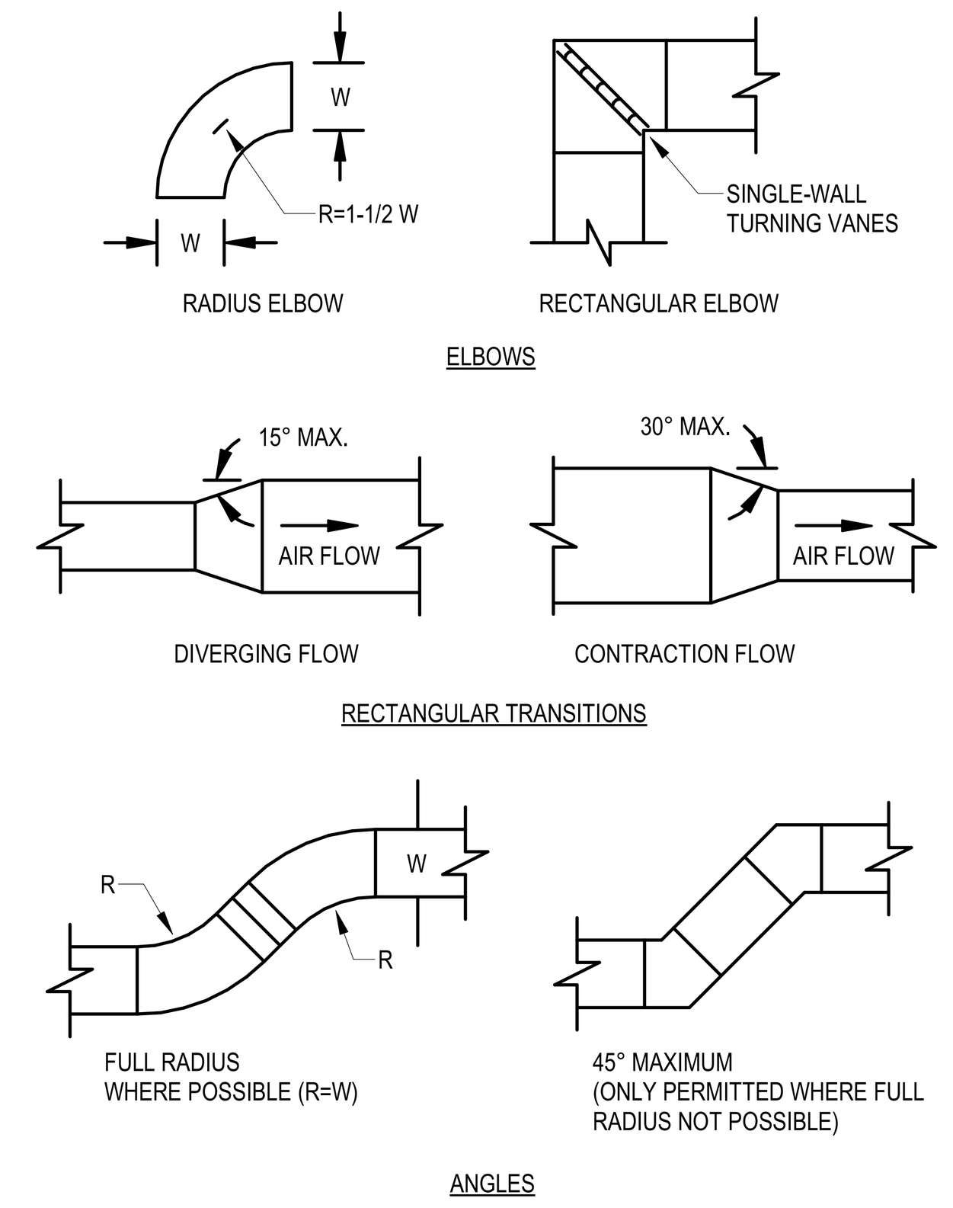
M6.4

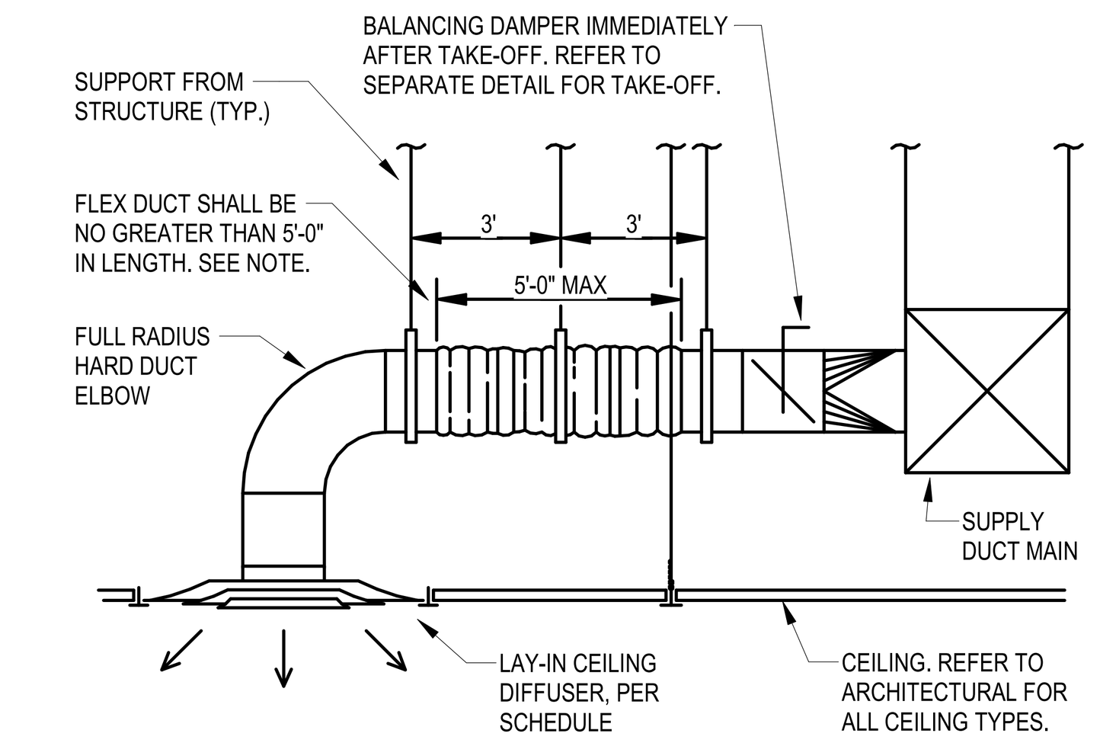


NOTES:
1. CONTRACTOR SHALL COORDINATE LOUVER INSTALLATION AND DUCTWORK WITH OTHER TRADES.
2. LOUVER PROVIDED AND INSTALLED BY CONTRACTOR.
3. CONTRACTOR SHALL PROVIDE BACKER ROD AND SILICONE SEALANT AROUND ENTIRE PERIMETER.
4. THIS CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT BOTTOM BLADES AND PLENUM SPACE DRAIN COMPLETELY TO EXTERIOR.

9 M7.0 LOUVER - PLENUM CONNECTION DETAIL
12" = 1'-0"

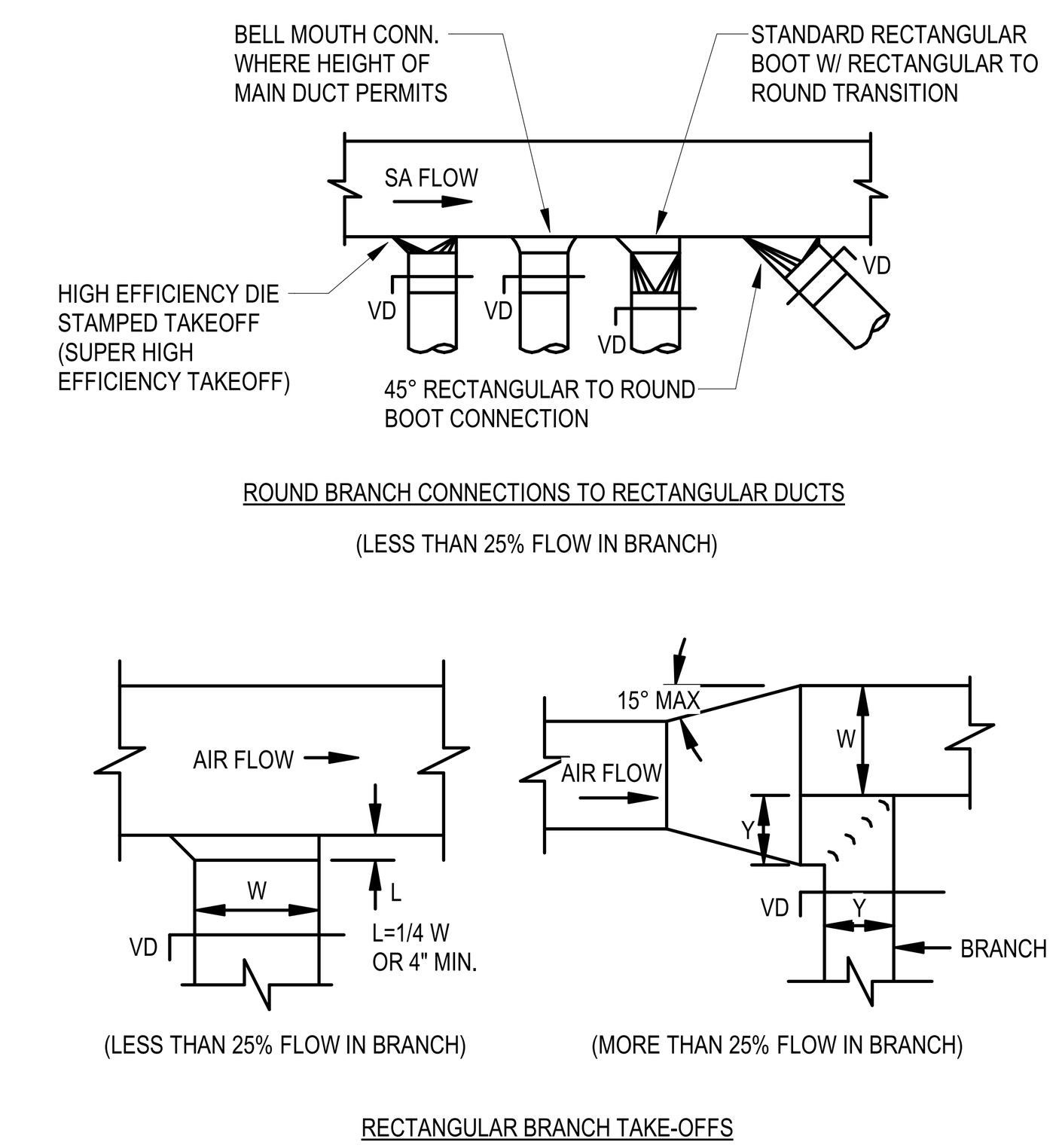


5 M7.0 DUCTWORK ELBOWS, TRANSITIONS, & ANGLES
12" = 1'-0"

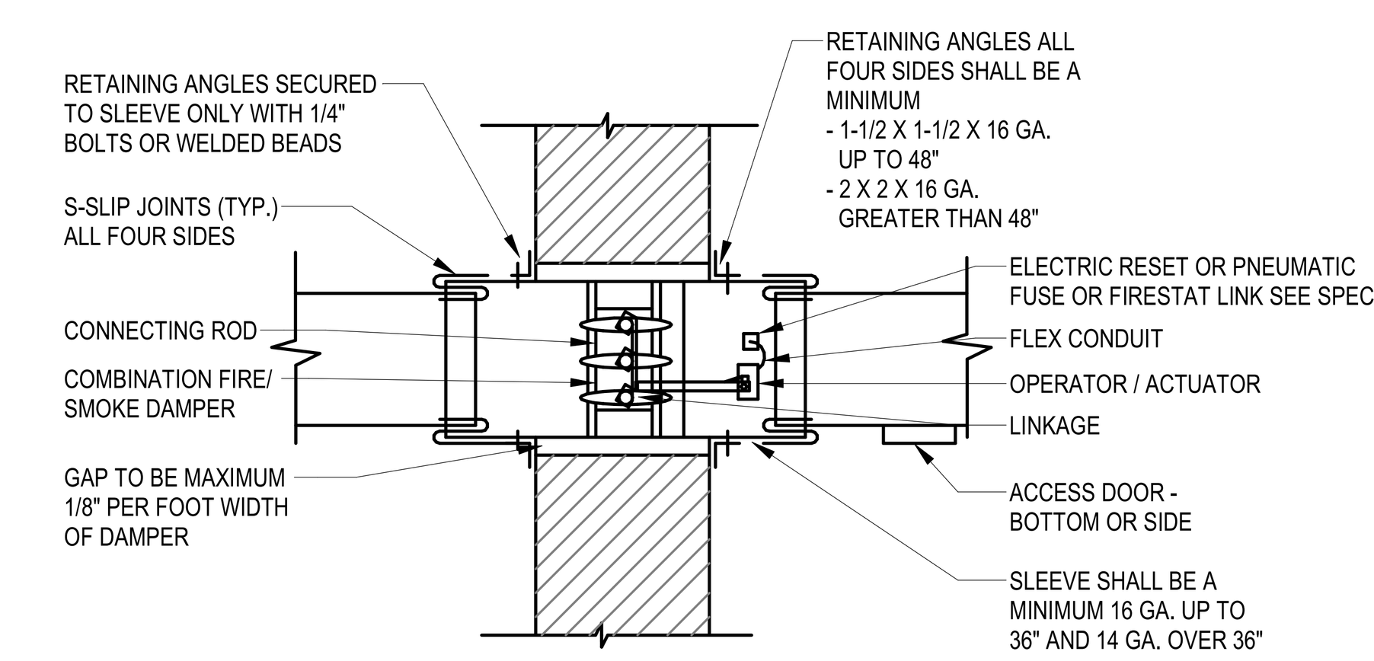


NOTES:
A. MAXIMUM FLEX DUCT LENGTH IS 5'-0"
B. MINIMUM LENGTH IS 3'-0"
C. FLEX DUCT SHALL BE SAME NOMINAL SIZE AS HARD ELBOW
D. HARD ELBOW SHALL BE SAME NOMINAL SIZE AS DIFFUSER CONNECTION, UNLESS INDICATED OTHERWISE ON DRAWINGS. REFER TO PLANS AND SCHEDULES.
E. FLEX DUCT SHALL BE SUPPORTED TO MINIMIZE SAGGING AND KINKING.
F. ELBOW AND ALL NON-FLEX DUCT INSULATED PER SPECIFICATIONS.

1 M7.0 CEILING DIFFUSER WITH HARD ELBOW CONNECTION
12" = 1'-0"

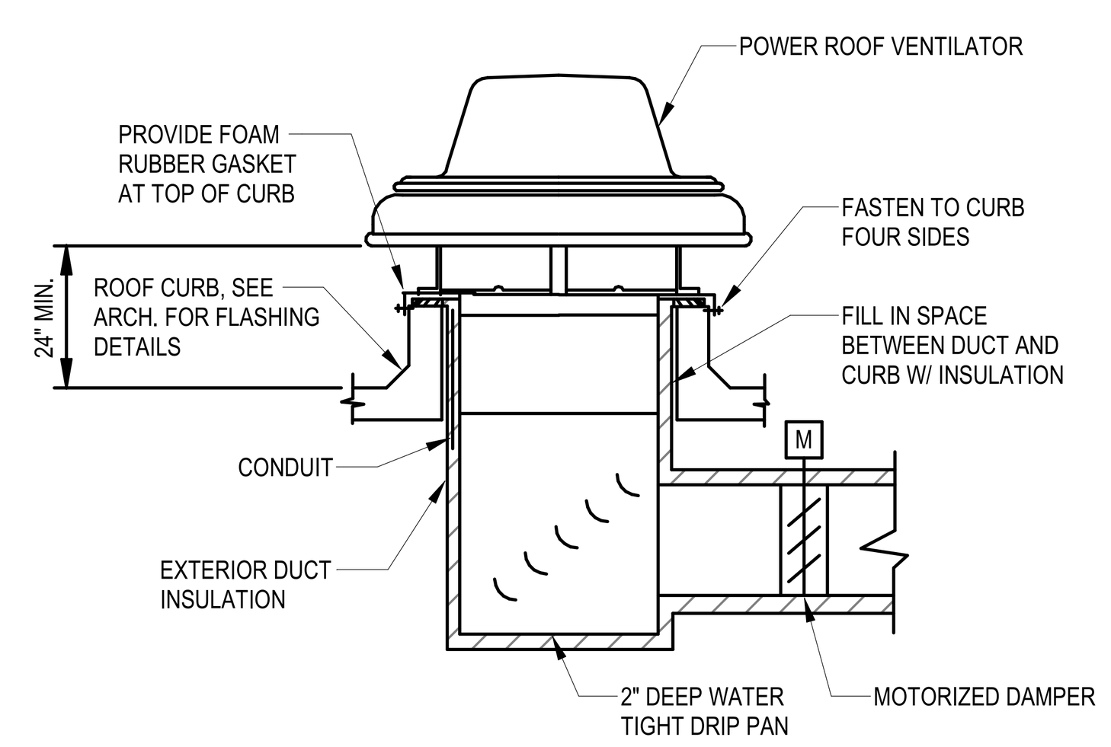


6 M7.0 DUCTWORK TAKE-OFFS
12" = 1'-0"

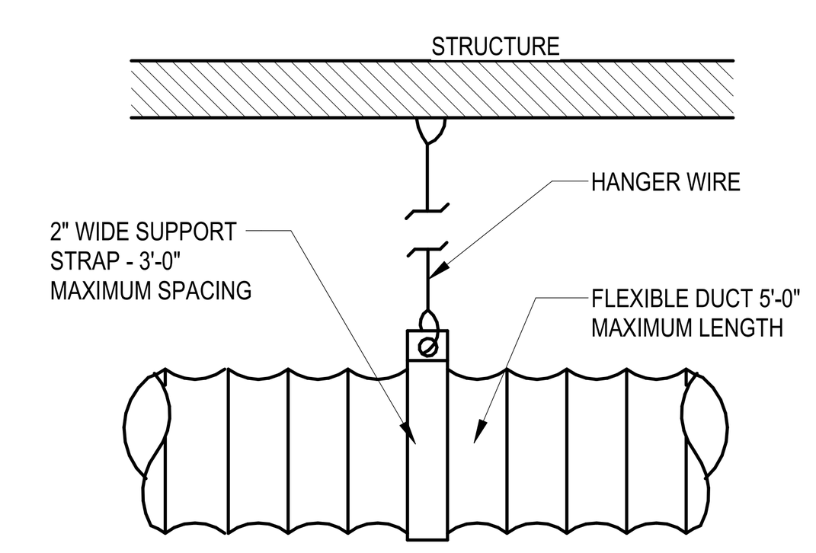


NOTES:
1. INSTALLATION INSTRUCTIONS ARE AS PER U.L. ASSEMBLY. VERIFY EACH MANUFACTURER'S INSTALLATION REQUIREMENTS.
2. CAREFULLY POSITION DAMPER OPERATING SHAFT EXTENSION SO THAT LINKAGE AND OPERATOR ARE READILY ACCESSIBLE.
3. PROVIDE ACCESS PANEL IN WALLS OR CHASES WHERE NEEDED.

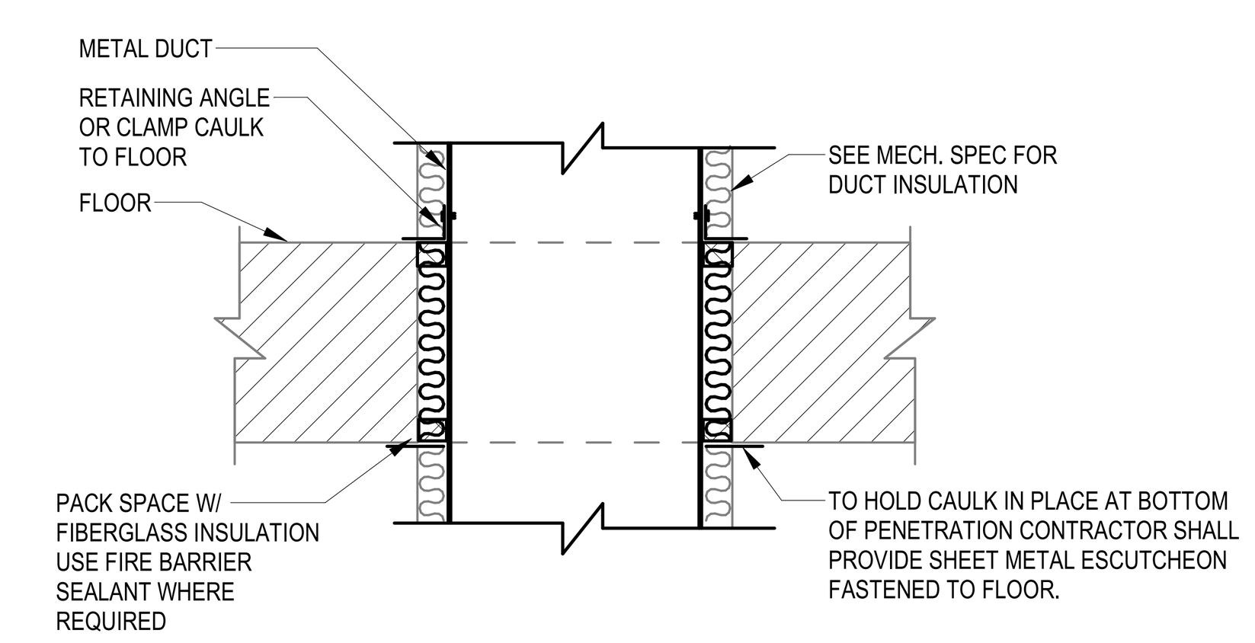
2 M7.0 COMBINATION FIRE/SMOKE DAMPER
12" = 1'-0"



10 M7.0 POWER ROOF VENTILATOR DETAIL
12" = 1'-0"

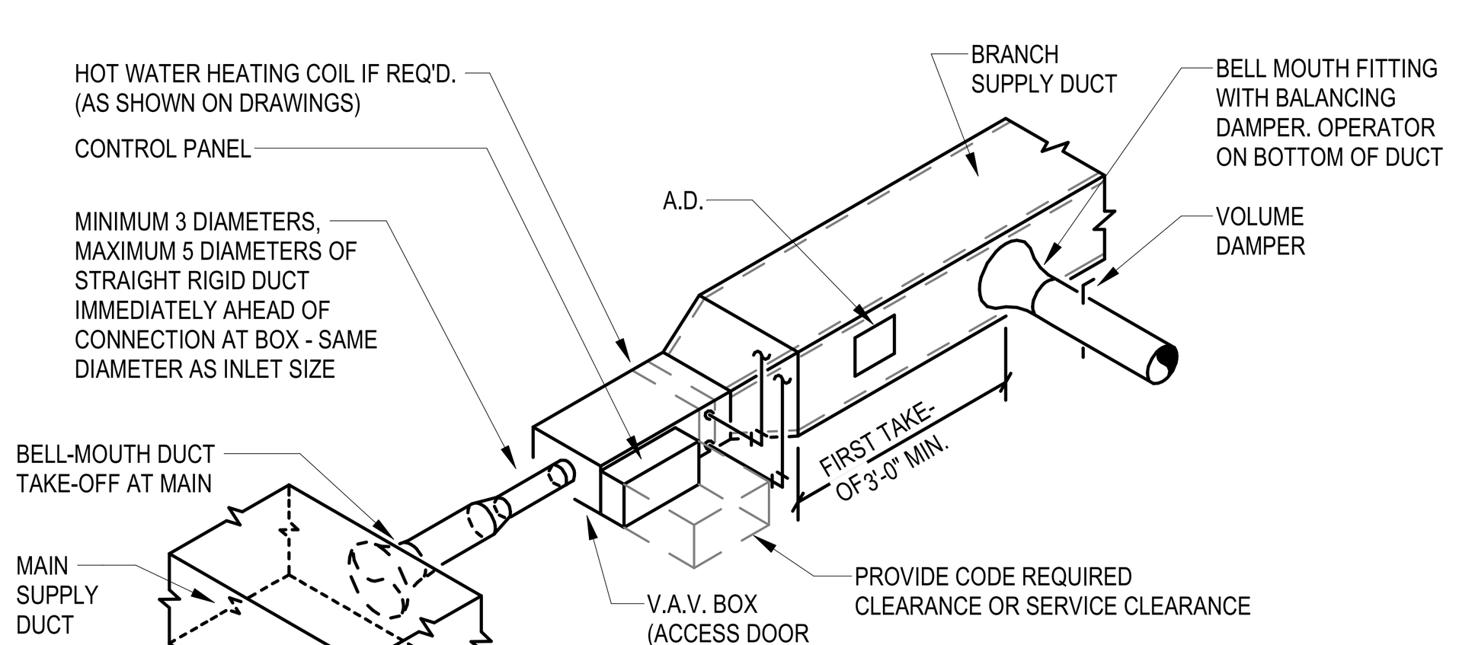


7 M7.0 FLEX-DUCT SUPPORT
12" = 1'-0"



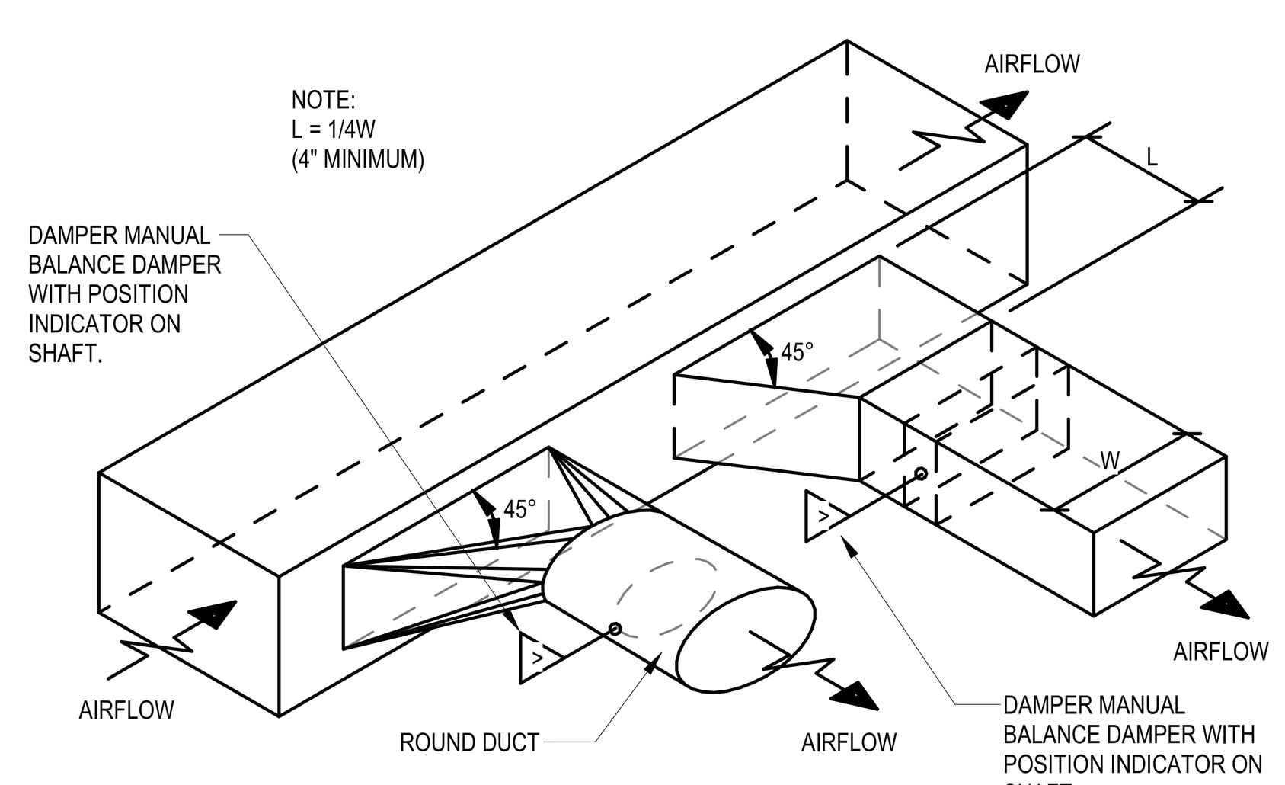
NOTES:
A. CONTRACTOR SHALL NEATLY CUT FLOOR OPENING, IN CLOSE COORDINATION WITH ALL TRADES.
B. OPENING THROUGH FLOOR SHALL BE LARGE ENOUGH FOR DUCT PLUS INSULATION, BUT SHALL NOT BE LARGER.
C. REFER TO STRUCTURAL FOR ADDITIONAL INFORMATION ON OPENINGS THROUGH FLOOR.
D. SUPPORT DUCT AT FLOOR PER SMACNA REQUIREMENTS.

3 M7.0 DUCT PENETRATION THROUGH FLOOR DETAIL
12" = 1'-0"

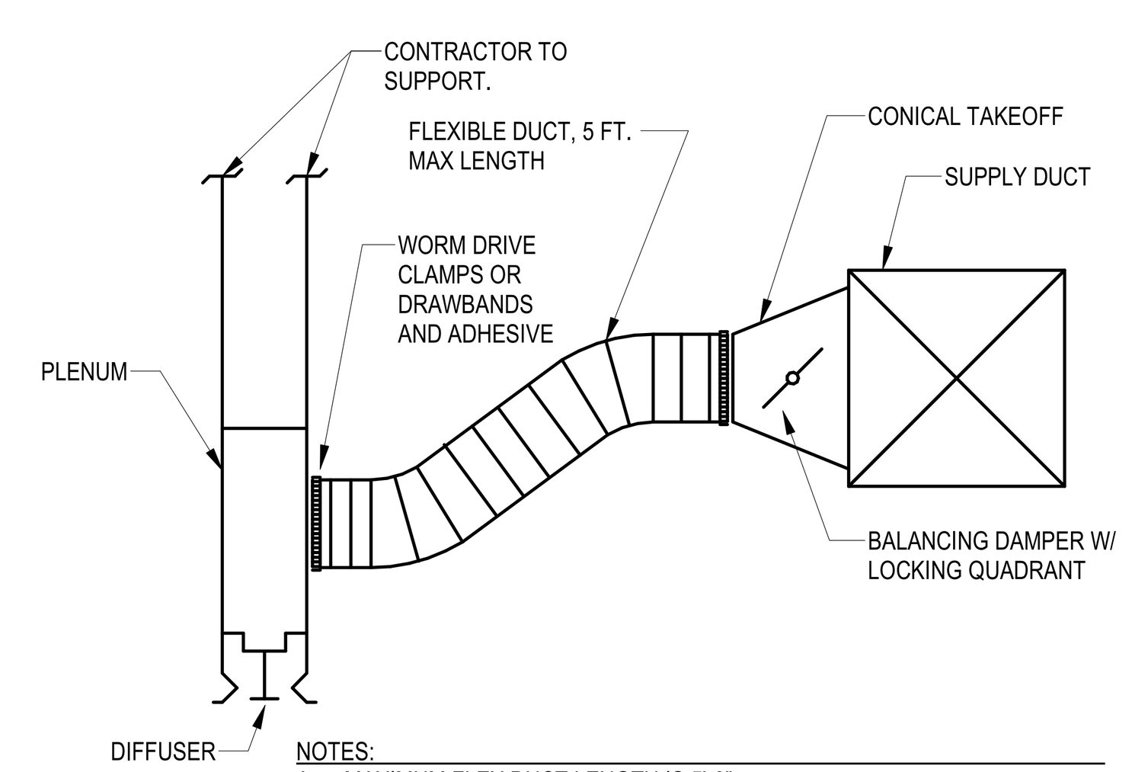


NOTES:
1. PROVIDE ACCESS PANEL ON VAV BOX IF IT HAS A HEATING COIL, UPSTREAM OF COIL
2. PIPE HEATING COIL FROM SAME SIDE AS CONTROLS. DO NOT BLOCK ACCESS TO PIPING OR CONTROLS
3. DIFFUSER TAKEOFFS MAY BE ON SIDE OR BOTTOM OF DUCT

12 M7.0 VAV BOX DETAIL
12" = 1'-0"

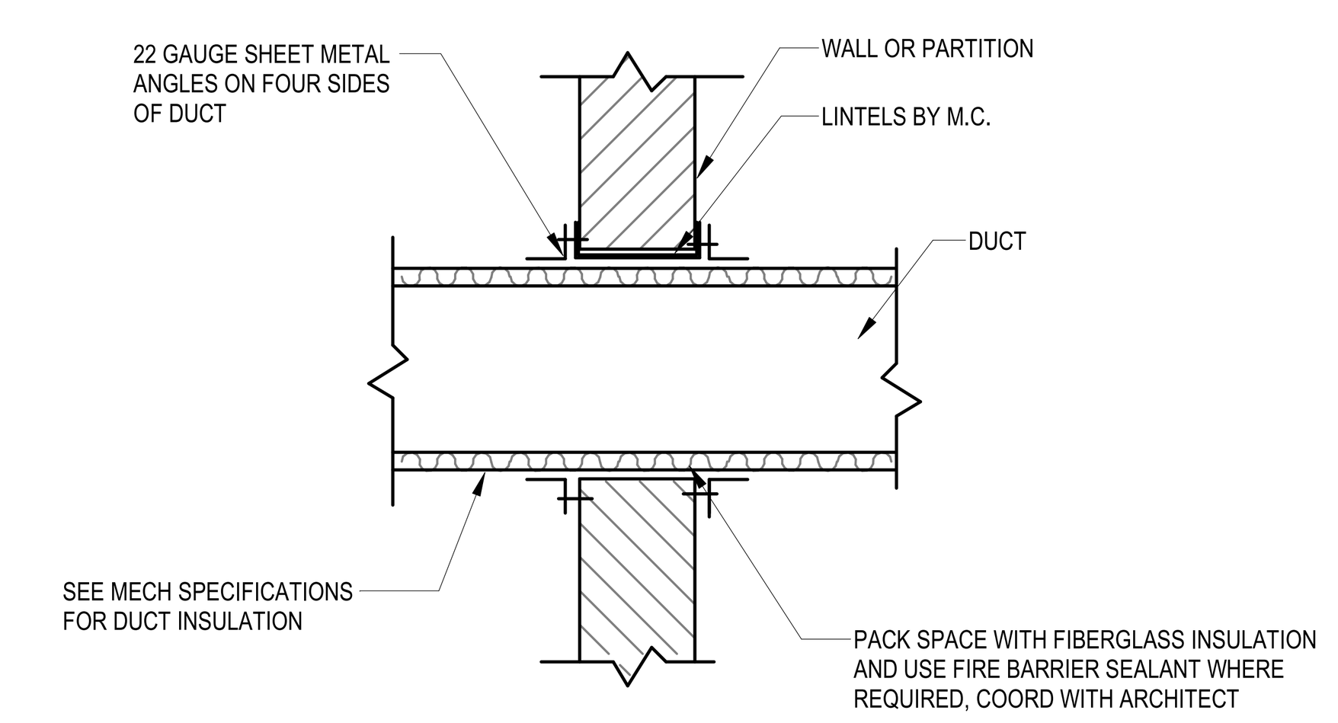


11 M7.0 RIGID DUCT TAKE-OFF DETAIL
12" = 1'-0"



NOTES:
A. MAXIMUM FLEX DUCT LENGTH IS 5'-0"
B. MINIMUM LENGTH IS 3'-0"
C. DUCT RUN-OUT SIZE PER PLAN
D. DUCT CONNECTION SIZE TO DIFFUSER PER SCHEDULE
E. FLEX DUCT SHALL BE SUPPORTED TO MINIMIZE SAGGING AND KINKING

8 M7.0 LINEAR DIFFUSER RUNOUT DETAIL
12" = 1'-0"



NOTES:
A. INSULATION SHALL CARRY THROUGH PENETRATION.
B. CONTRACTOR IS RESPONSIBLE FOR REVIEWING MECHANICAL AND ARCHITECTURAL PLANS TO VERIFY ALL WALL PENETRATIONS.
C. LINTELS ARE REQUIRED ONLY IN MASONRY WALLS WHERE THE WIDTH OF THE DUCT IS GREATER THAN 12". REFER TO SEPARATE DETAIL. REFER ALSO TO STRUCTURAL PLANS.
D. REFER TO ARCHITECTURAL AND MECHANICAL PLANS FOR LOCATIONS OF FIRE-RATED WALLS. WHERE DUCT PENETRATES FIRE-RATED WALLS, THE CAULK NOTED IN DETAIL SHALL BE FIRE-RATED CAULK, INSTALLED PER MANUFACTURER'S REQUIREMENTS.

4 M7.0 DUCT PENETRATION THROUGH INTERIOR WALL
12" = 1'-0"

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MECHANICAL DETAILS

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M7.0

2302
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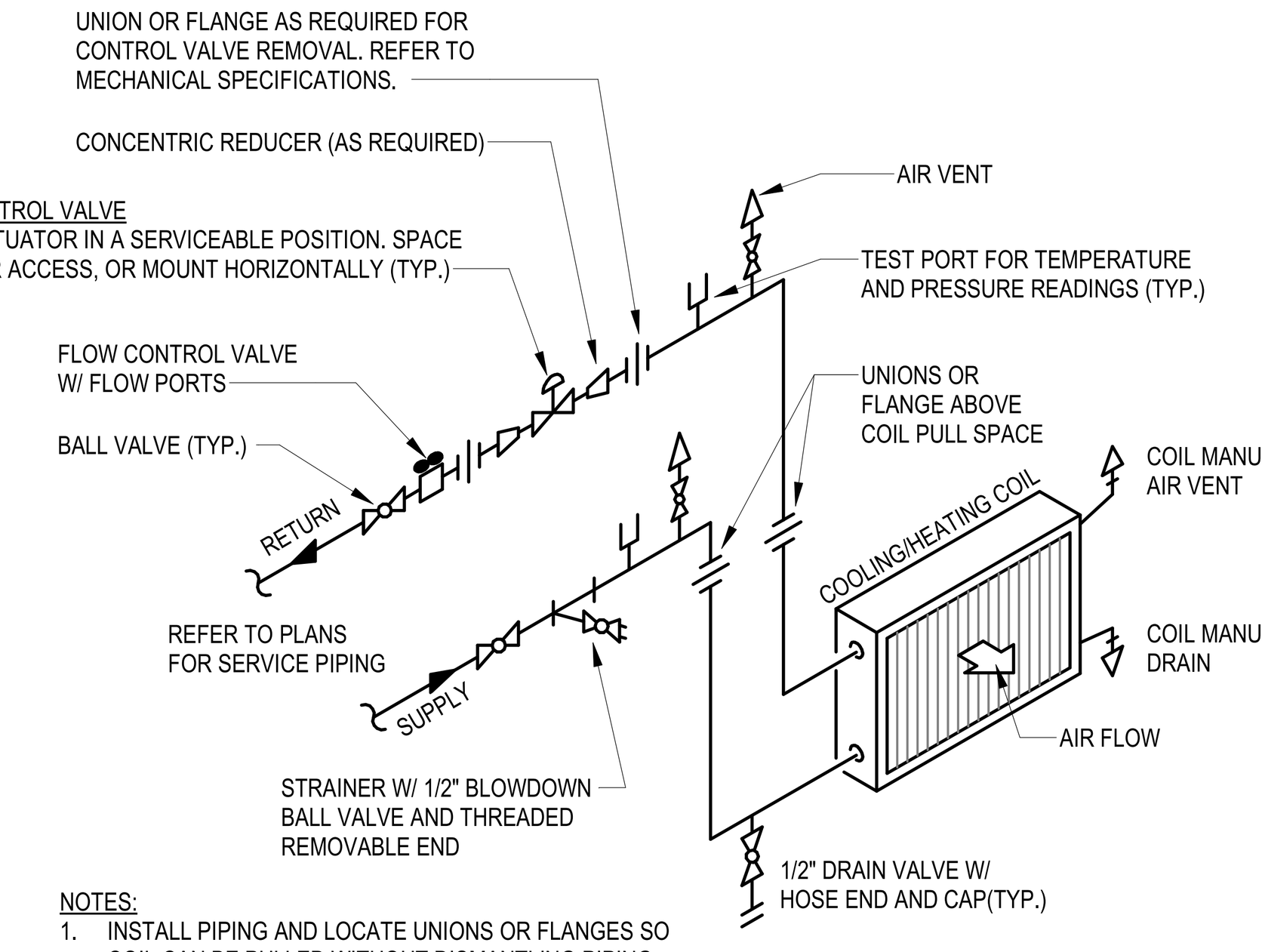
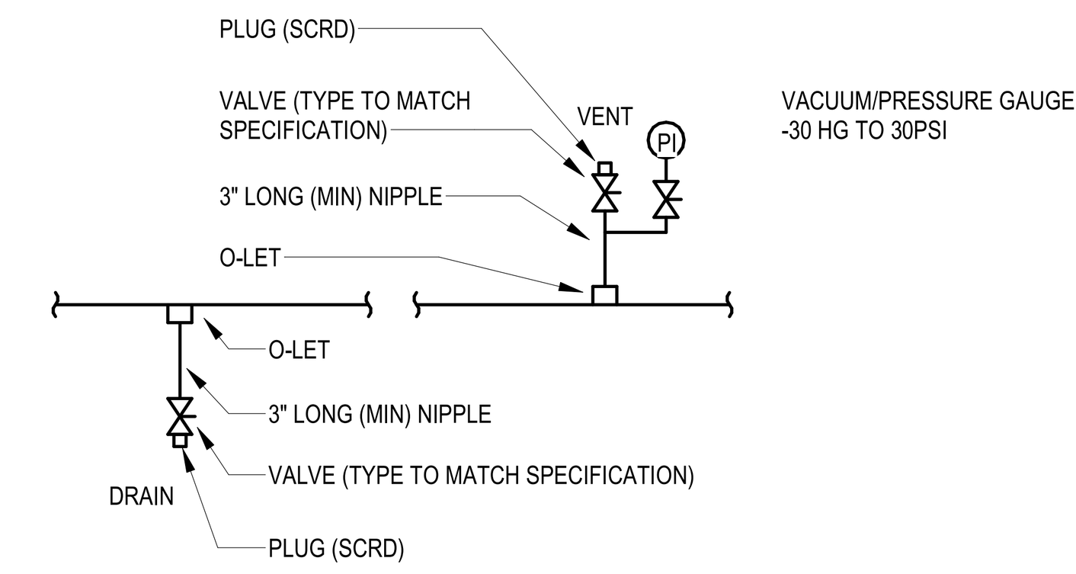


NOTES:
1. INSTALL PIPING AND LOCATE UNIONS OR FLANGES SO COIL CAN BE PULLED WITHOUT DISMANTLING PIPING.
2. COILS SHALL HAVE SAME END CONNECTIONS.
3. THIS DETAIL APPLIES TO REHEAT, FAN POWERED VAV'S, AND FAN COIL UNIT HEATING AND COOLING COILS.
4. REFER TO MECHANICAL SPECIFICATIONS FOR EXACT TYPE OF VALVE, VENT, FITTINGS, STRAINER, PIPING, ETC., USED FOR APPLICATION.

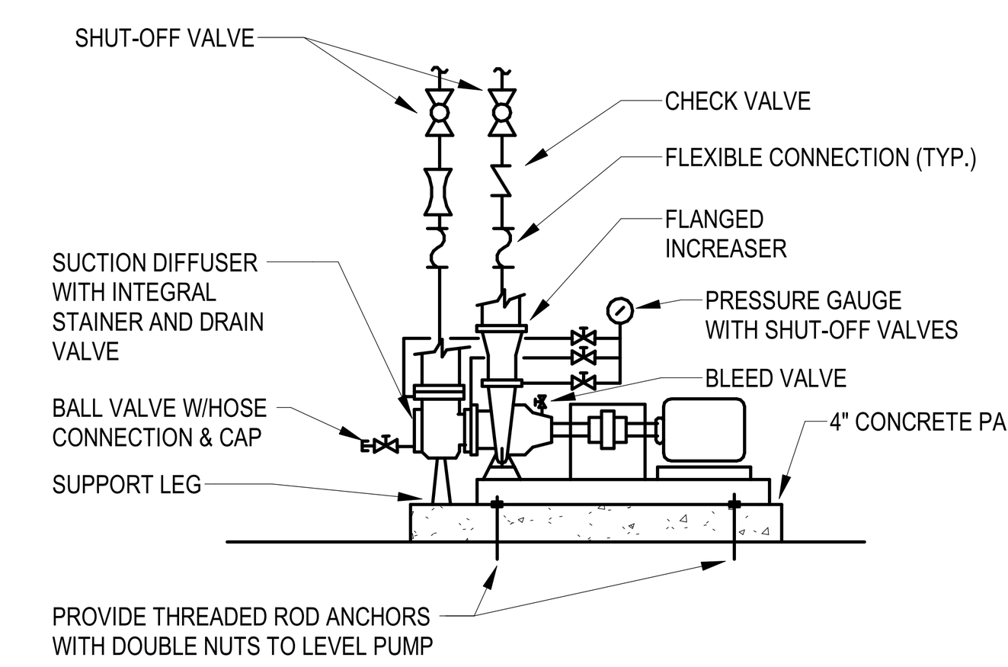
8 / M7.1 VAV/FAN COIL PIPING
12" = 1'-0"



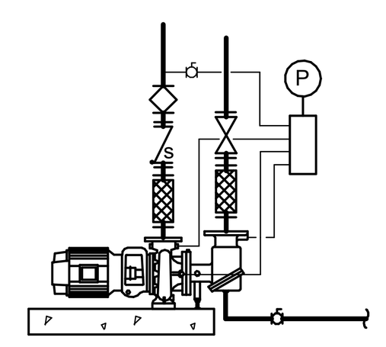
NOTES:
1. THIS DETAIL SHALL APPLY TO ALL OF THE FOLLOWING FLUID SYSTEMS; AS APPLIED TO THIS PROJECT.
2. INTENT IS TO ALLOW SYSTEM TO BE FULLY AND COMPLETELY DRAINED AND FILLED.
3. MINIMUM VENT/DRAIN SIZE 3/4" (EXCEPT 1/2" AND SMALLER PIPE SYSTEM)
4. CONTRACTOR SHALL PROVIDE AS MANY SUCH CONNECTIONS AS NECESSARY TO DRAIN/FILL SYSTEM(S).
5. CONTRACTOR SHALL SHOW ON AS-BUILT PLANS WHERE ALL SUCH CONNECTIONS ARE PLACED.
6. ALL VENT/DRAIN PIPING SHALL MATCH APPLICABLE PIPE SPECIFICATION. (I.E., SCRD, SW, ETC.)
7. PLACE LONGER PIPE NIPPLES AS REQUIRED FOR VALVE ACCESS AND OPERATION CLEARANCE ON INSULATED PIPE.
8. AT ONE POINT PROVIDE A VACUUM/PRESSURE GAUGE FILL SYSTEM TO MINIMUM + 4 PSI AT HIGH POINT.

4 / M7.1 HIGH POINT VENT, LOW POINT DRAIN DETAI
12" = 1'-0"

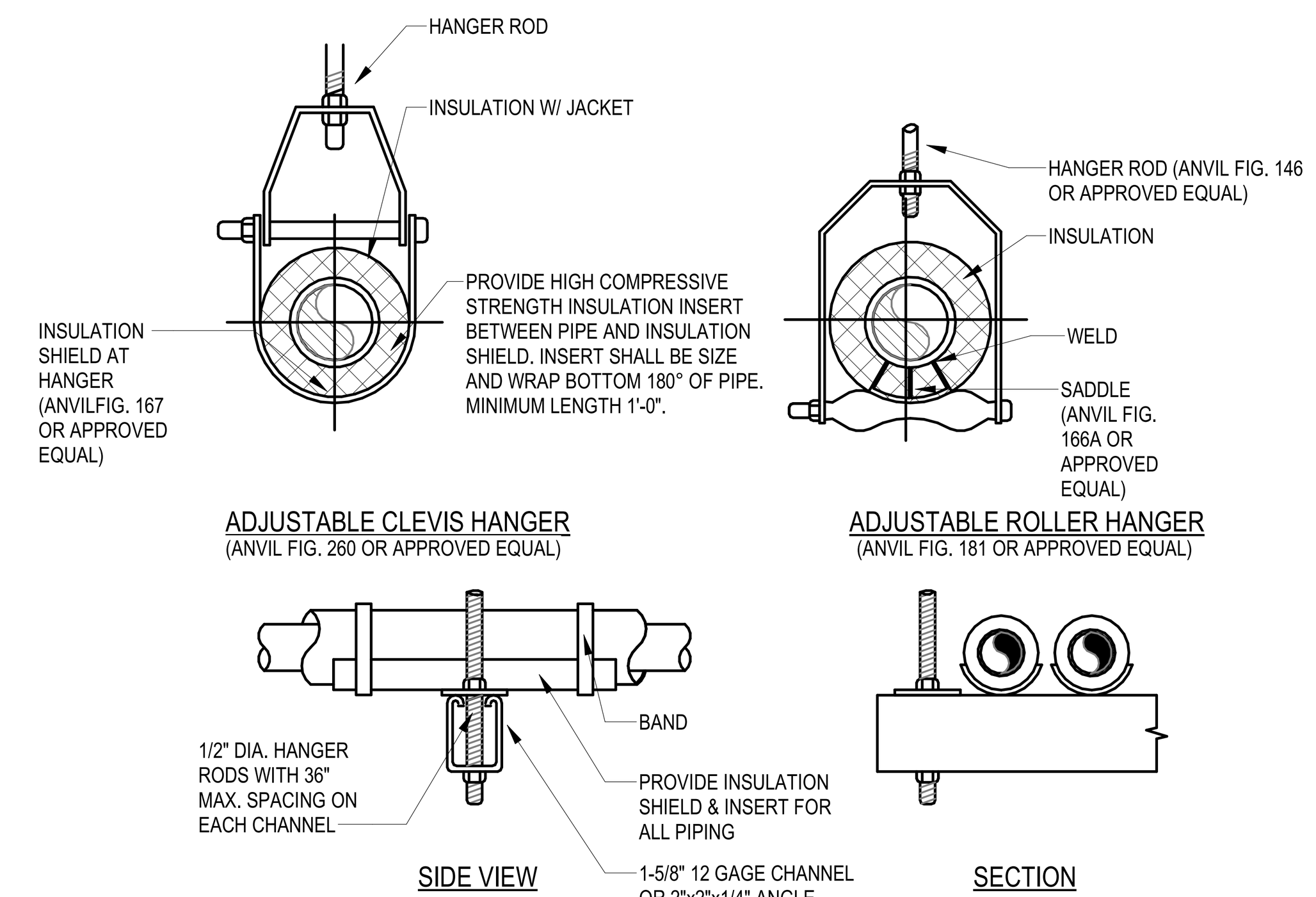
NOTES:
1. PRESSURE GAUGE AND VALVES TO BE LOCATED IN PUMP PORTS WHEN AVAILABLE.
2. RE-ALIGN PUMPS AFTER INSTALLATION.
3. GROUT PUMP FRAM WITH NON SHRINKING GROUT.



1 / M7.1 BASE-MOUNTED PUMP WITH VFD
12" = 1'-0"



6 / M7.1 PUMP ES
1/8" = 1'-0"



TRAPEZE HANGER FOR UP TO 800 LB. UNIFORM LOAD

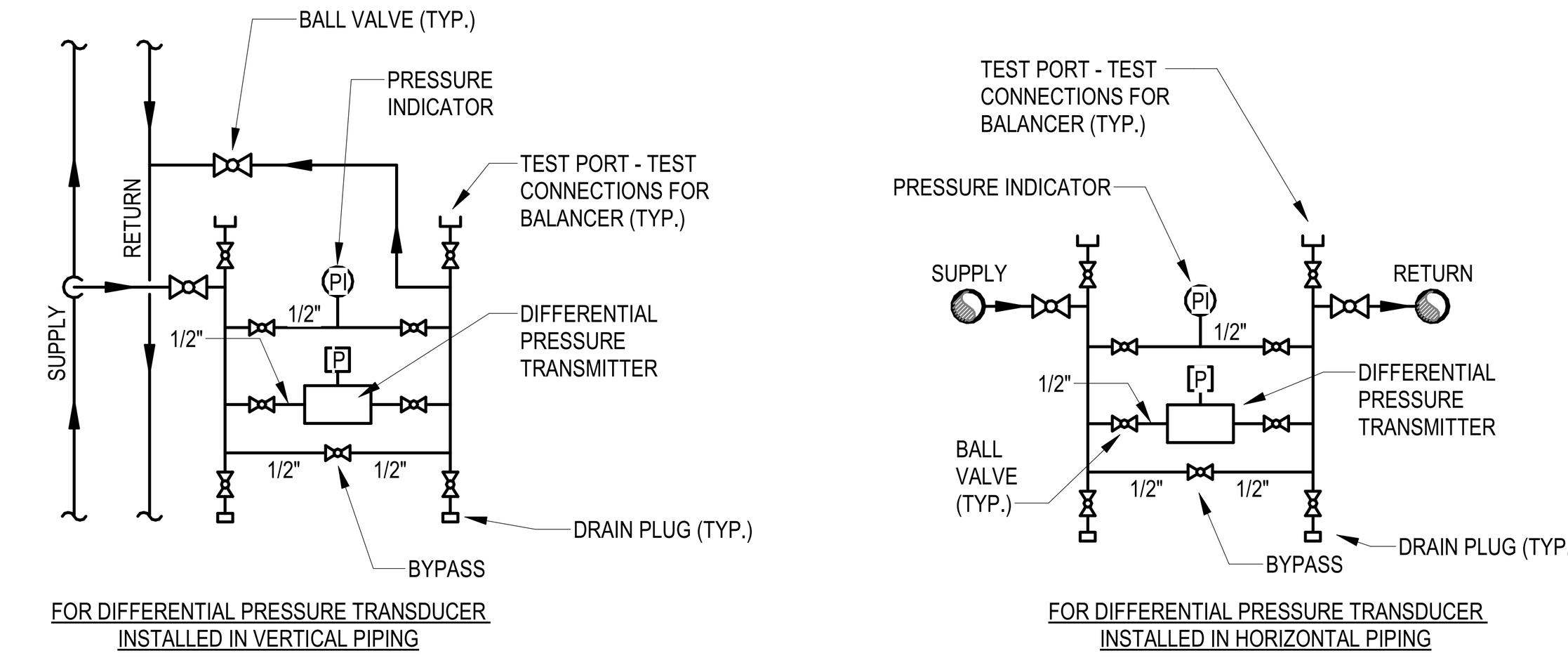
(FOR LOADS >800 LBS. ANVIL FIG. 45/46/50 OR APPROVED EQUAL)

NOTE: SEE MFR'S THREADED ROD DATA FOR LOAD CARRYING CAPACITIES.
ROD: ASTM. A36

MAXIMUM PIPE/TUBING SUPPORT SPACING (LINEAR FEET)

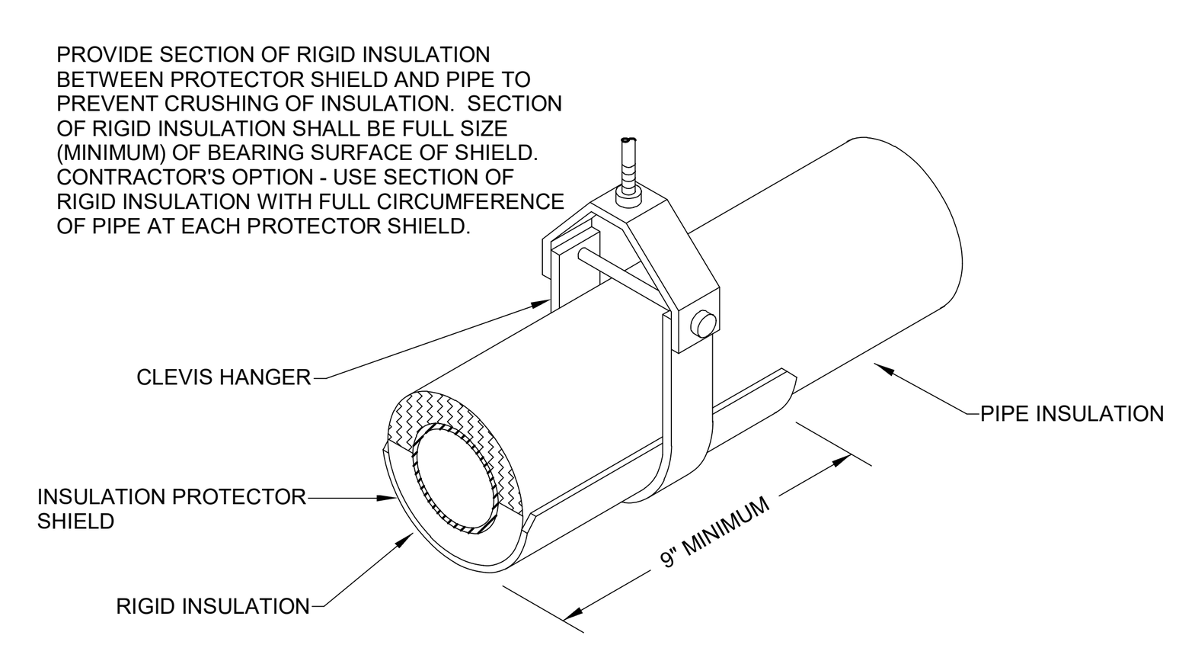
NOM. PIPE SIZE (INCH)	TO 3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
CARBON STEEL (MAX. 750°F)																		
SCH. 40/STD.	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
SCH. 80	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
STAINLESS STEEL (MAX. 750°F)																		
SCH. 10	7	8 1/2	10	11	11	13	14	15	17	18	20	22	-	-	-	-	-	-
SCH. 40	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
PVC/CPVC																		
SCH 40 (100°F)	4	4 1/2	5	5	5	6	6	6 1/2	7	7 1/2	8	8 1/2	9 1/2	10	10 1/2	-	-	-
SCH. 80 (100°F)	4 1/2	5	5 1/2	5 1/2	6	6 1/2	7	7 1/2	8	9	9 1/2	10	10 1/2	11	12 1/2	-	-	-
ANVIL HANGER ROD SIZE (INCH)	3/8	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	3/4	3/4	7/8	7/8	1	1	1	1 1/4	1 1/4
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																		

5 / M7.1 PIPE SUPPORT/SPACING DETAIL
12" = 1'-0"

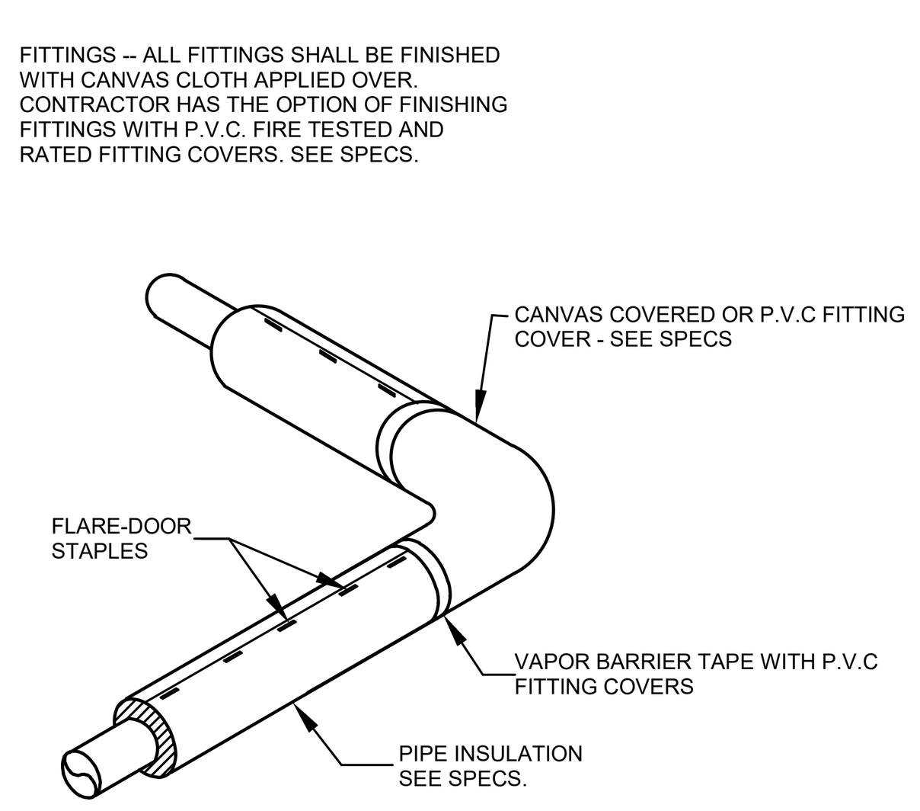


NOTES:
1. SEE HYDRONIC PIPING SCHEMATIC/P&ID'S/PIPING DRAWINGS FOR LOCATION OF DIFFERENTIAL PRESSURE TRANSMITTERS.
2. DIFFERENTIAL PRESSURE TRANSMITTER TO BE INSTALLED TO ALLOW AIR AND DEBRIS TO BE FLUSHED THROUGH LOWER BYPASS.
3. REFER TO PLANS FOR SERVICE PIPING.
4. REFER TO MECHANICAL SPECIFICATIONS FOR EXACT TYPE OF VALVE, VENT, FITTINGS, STRAINER, PIPING, ETC., USED FOR APPLICATION.

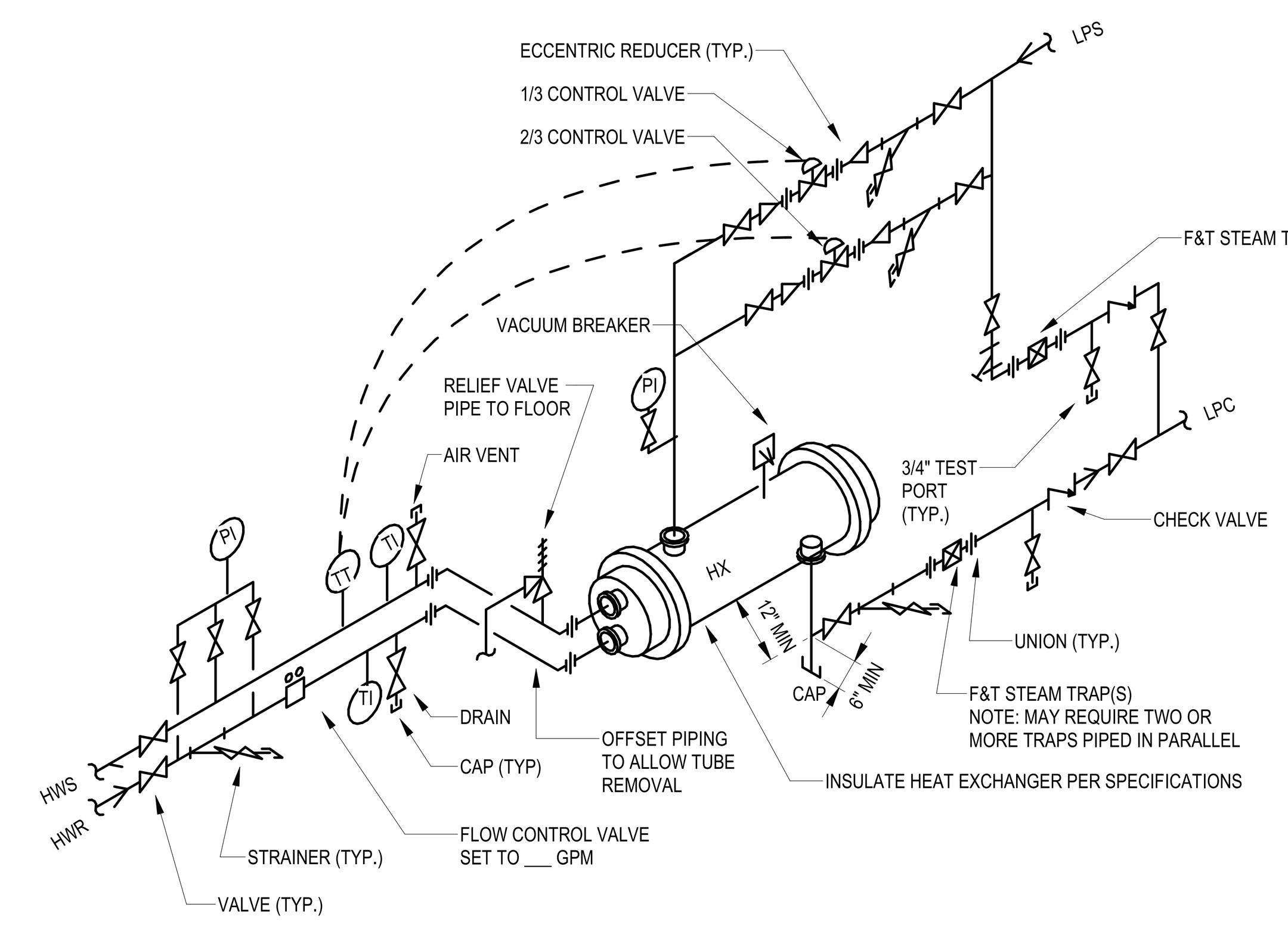
2 / M7.1 DIFFERENTIAL PRESSURE SENSOR PIPING
12" = 1'-0"



TYPICAL PIPE SUPPORT DETAIL WITH SHIELD
SCALE: NONE

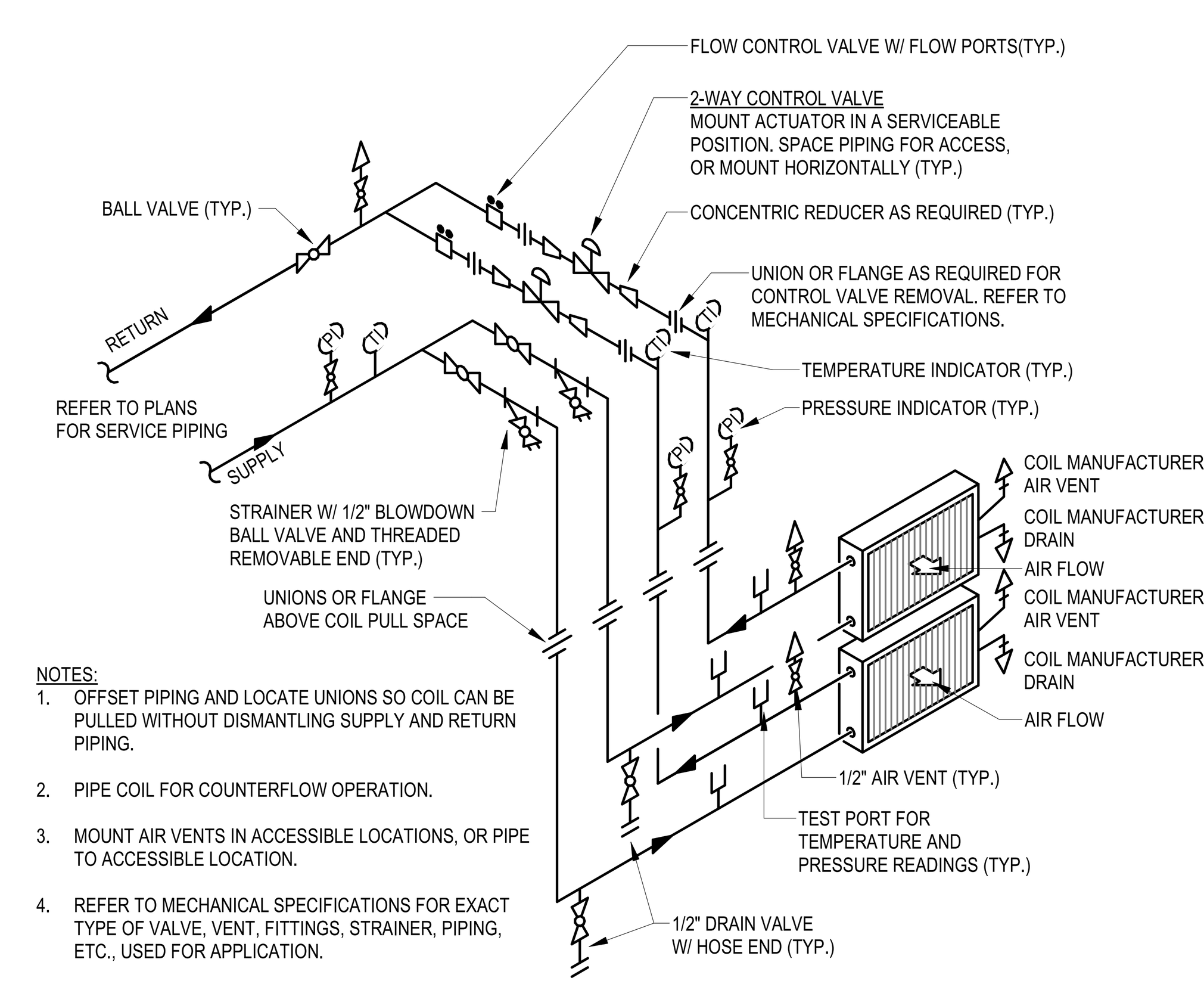


TYPICAL DETAIL OF INSULATION AT PIPE FITTING
SCALE: NONE



NOTES:
1. SEE PLANS FOR HX LOCATION AND ELEVATION, AND PIPE SIZES, ELEVATIONS AND ROUTING.
2. INSTALL PIPING AND PROVIDE FLANGES OR UNIONS SO TUBE BUNDLE CAN BE REMOVED WITHOUT DISMANTLING PIPING.
3. PITCH STEAM AND CONDENSATE PIPING IN DIRECTION OF FLOW.

7 / M7.1 STEAM TO HOT WATER HEAT EXCHANGER (VARIABLE LOAD) DETAIL
12" = 1'-0"



NOTES:
1. OFFSET PIPING AND LOCATE UNIONS SO COIL CAN BE PULLED WITHOUT DISMANTLING SUPPLY AND RETURN PIPING.
2. PIPE COIL FOR COUNTERFLOW OPERATION.
3. MOUNT AIR VENTS IN ACCESSIBLE LOCATIONS, OR PIPE TO ACCESSIBLE LOCATION.
4. REFER TO MECHANICAL SPECIFICATIONS FOR EXACT TYPE OF VALVE, VENT, FITTINGS, STRAINER, PIPING, ETC., USED FOR APPLICATION.

3 / M7.1 FACE SPLIT COIL PIPING DETAIL
12" = 1'-0"

NOTE:

IT IS NOT INTENDED THAT THE PLANS SHOW ALL OFFSETS IN PIPES, CONDUITS, AND DUCTS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTENDED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB-CONTRACTORS TO COORDINATE INSTALLATION OF THE WORK AND TO PROVIDE THE NECESSARY OFFSETS, TRANSFORMATIONS, AND FITTINGS REQUIRED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR CORRECTION CONFLICTS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND SECTIONS ARE SHOWN FOR THE CONTRACTORS CONVENIENCE AND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.

2302
UNIVERSITY OF KENTUCKY WHITEHALL RENOVATION & ADDITION
7/31/2024 2:46:08 PM

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MECHANICAL DETAILS

JOB NO.	2302
DATE	7/22/2024
DRAWN	RJS
CHECKED	RJS

REVISIONS

No.	Description	Date

SHEET
M7.1

KEY

- Equipment
- JACE Control Panel
- TIER 2 Controller

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UNIVERSITY OF KENTUCKY
WHITE HALL RENOVATION
LEXINGTON, KENTUCKY

GROUND FLOOR

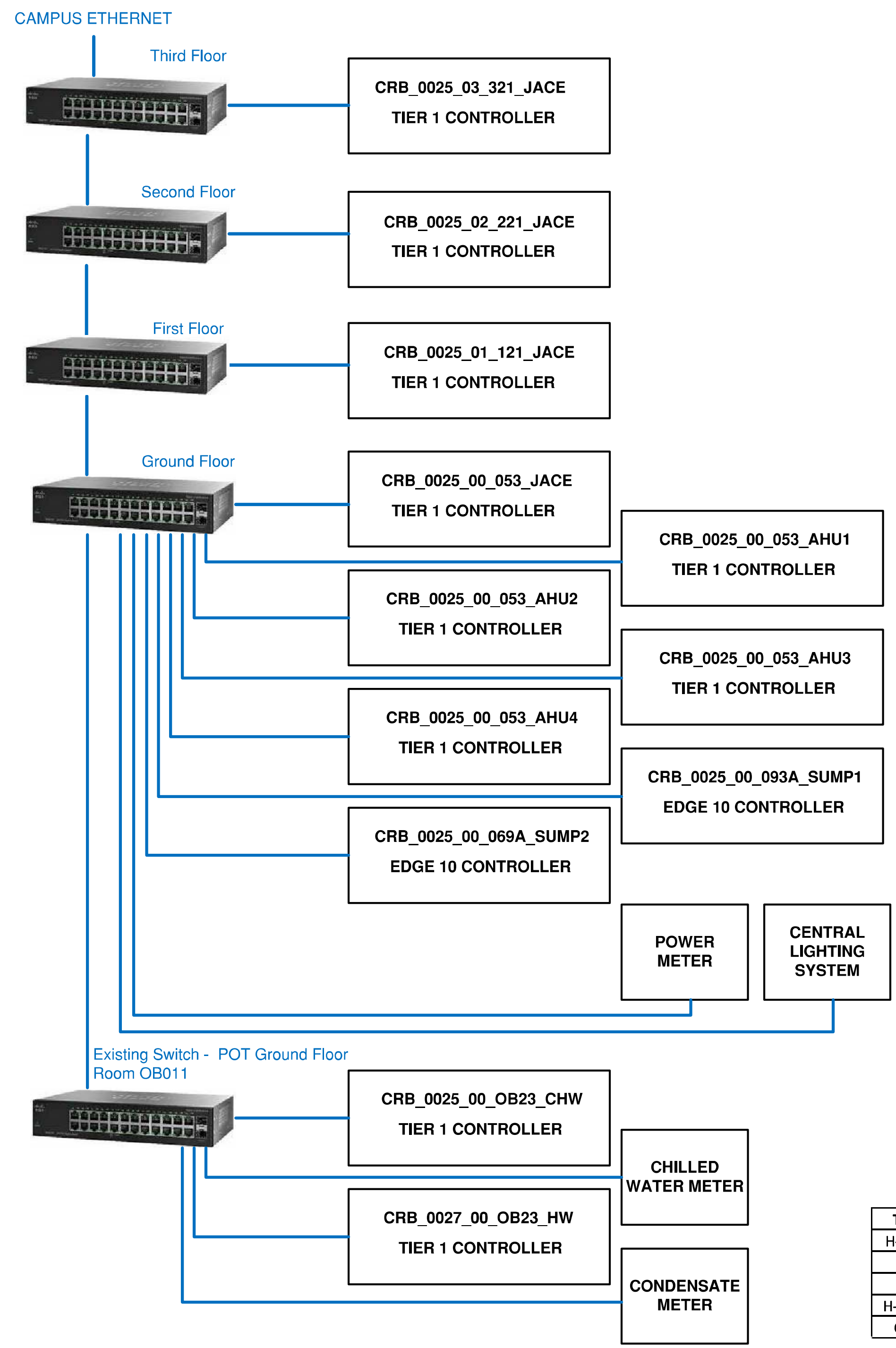
JOB NO.	2302
DATE	5/22/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
DD		FEB 7, 2024

SHEET

IC2.01



NOTES:

Implementation to meet or exceed the UK Controls Standard 230900S03 INSTRUMENTATION AND CONTROL for HVAC.

Drawing notes listed are minimum requirements for the implementation and may be more stringent that the UK Controls Standard.

The design shown is a basis of design concept and is intended as a guide for the solution. The solution provided shall meet or exceed design intent. Proposed design exceptions must be identified during the proposal process and approved by UK Facilities Management Controls Engineering Manager.

Direct Digital Control System (DDC):

Tier 1 Controllers (Building Controller B-BC):

Control Panel:
Tier 1 Control panels to be located on each floor and at each major equipment piece. All Control Panes are to be the same size throughout the building with minimum size of 36” x 24” x6”. Each Control Panel is to be supplied with a BACnet enabled UPS. (Basis of design: Functional Devices PSH600-UPS-BC)

Controller:
Controllers to utilize an open access licensing procedure. All usernames and passwords to be provided to owner.
Approved Controllers:
- Vykon: JACE-8000 Controller or Newer Controller
- Johnson Controls: FX90 JACE Controller
- Honeywell: HON-9000 JACE

Device names shall comply with the format:
BuildingName_BuildingNumber_Floor_RoomNumber_DeviceType
The project format is CRB_0025_

Tier 2 Controllers (Advanced Application Controller B-AAC, Application Specific Controller B-ASC):

Controller:
Controllers to utilize an open access licensing procedure. All usernames and passwords to be provided to owner. Each Controller to be supplied power typically 24VAC and communications. (Power Basis of design: Functional Devices PSH500A)

Approved Controllers:
- Honeywell: CIPer Series
- Johnson Controls: FX-PC Series, Metasys Extended Architecture Series
- Distech : BACnet ECB

Point names shall comply with the format:
BuildingName_Floor_RoomNumber_DeviceType_EquimentShortName_Function
The project format is CRB_

HVAC CONTROL WIRE STANDARDS

TAG	APPLICATION	AWG	COND	SHIELD	STRANDED	PLENUM	LOW CAP	COLOR	STRIPE
H-BAC	HVAC BACNET COMM	22	3	YES	YES	YES	YES	BLUE	NONE
IO2	INPUTS	18	2	YES	YES	YES	NO	ORANGE	NONE
IO4	OUTPUTS	18	4	YES	YES	YES	NO	WHITE	NONE
H-PWR	DC VOLTAGE	18	2	NO	YES	YES	NO	BROWN	NONE
CAT	OT NETWORK	CAT6E				YES	YES	BLUE	NONE

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LEXINGTON, KENTUCKY

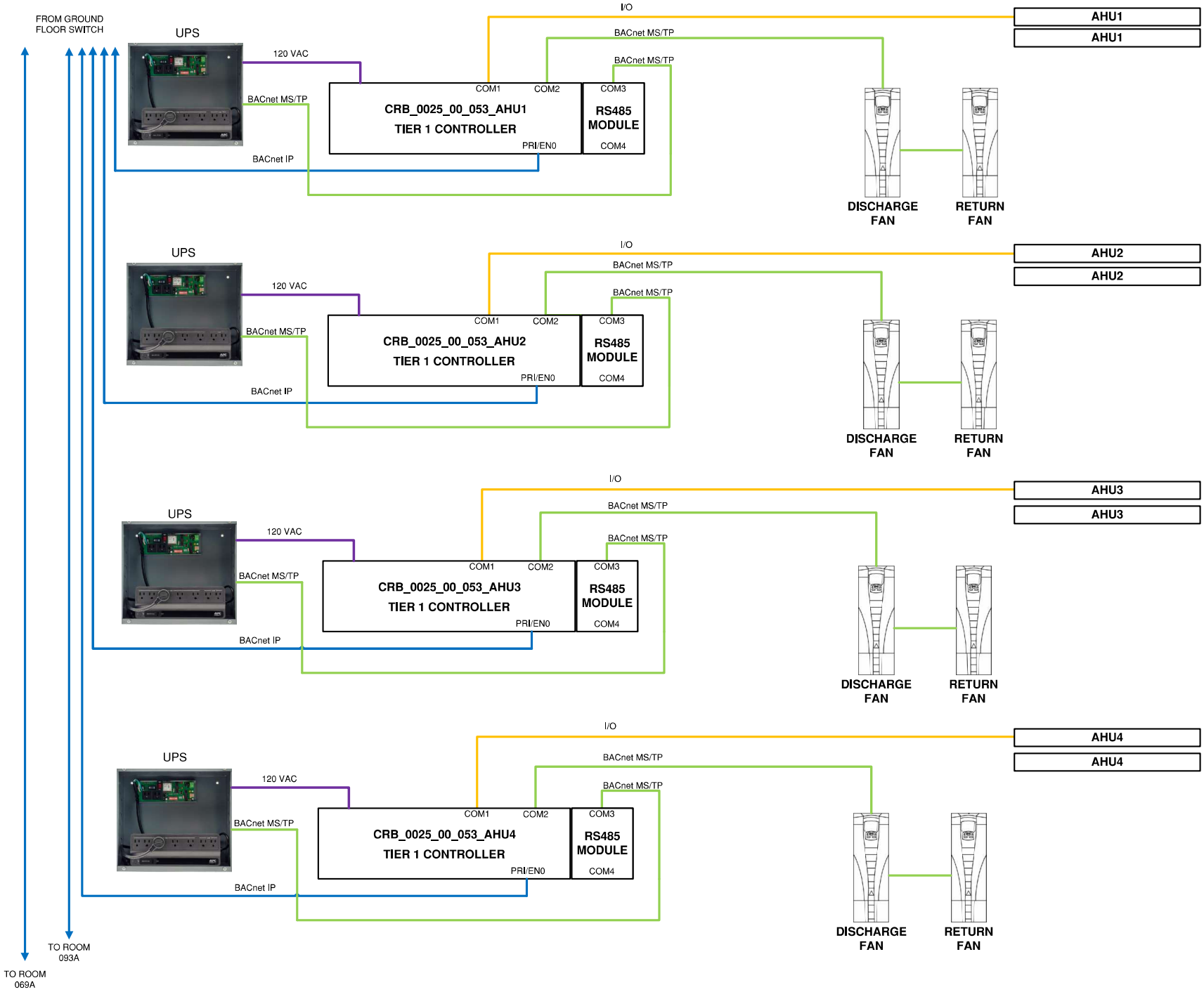
SYSTEM ARCHITECTURE
RISER

JOB NO.	2302
DATE	5/22/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
DD		FEB 7, 2024

SHEET
IC3.50



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GROUND FLOOR ARCHITECTURE

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

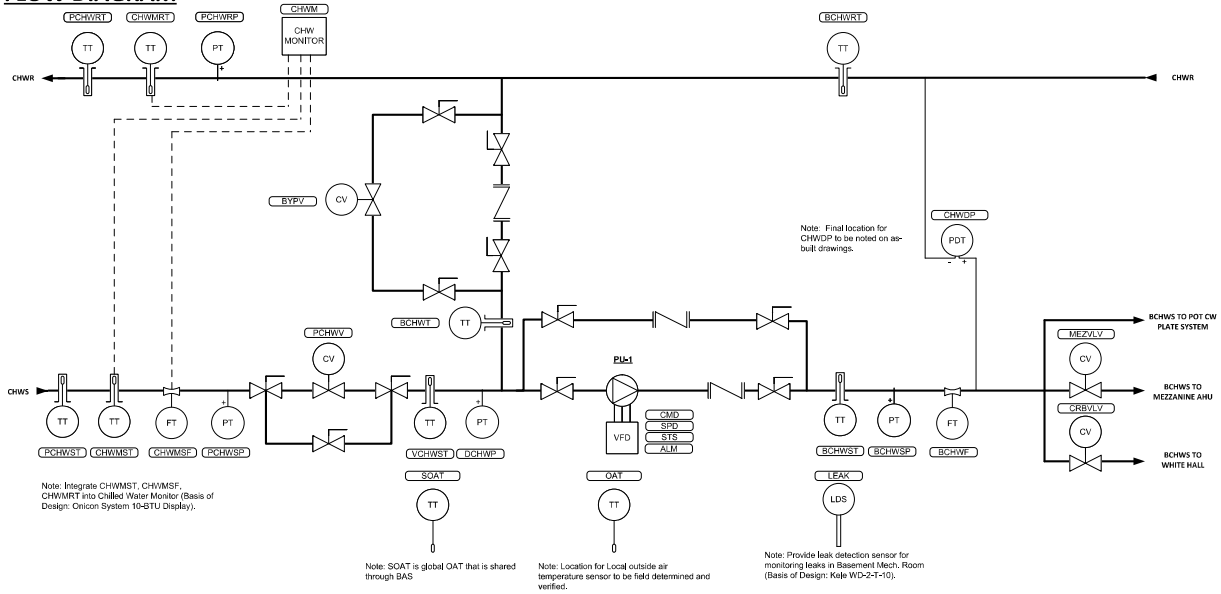
REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC3.53

FLOW DIAGRAM



BILL OF MATERIALS

Qty	Device Tag	Description	Furnished By	Installed By	Wired and Terminated By
1	PCHWST	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT	CONTRACTOR	CONTRACTOR	CONTRACTOR
1	PCHWRT	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	BCHWST	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	BCHWRT	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	BCHWT	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CHWMRT	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CHWMST	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	VCHWST	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	OAT	OUTSIDE AIR TEMPERATURE TRANSMITTER			
1	PCHWSP	PRESSURE TRANSMITTER			
1	PCHWRP	PRESSURE TRANSMITTER			
1	DCHWP	PRESSURE TRANSMITTER			
1	BCHWSP	PRESSURE TRANSMITTER			
1	CHWDP	DIFFERENTIAL PRESSURE SENSOR			
1	BCHWF	FLOW TRANSMITTER WITH ELEMENT			
1	CHWMSF	FLOW TRANSMITTER WITH ELEMENT			
1	PCHWV	CHILLED WATER VALVE WITH ACTUATOR			
1	MEZVLV	CHILLED WATER VALVE WITH ACTUATOR			
1	CRBVLV	CHILLED WATER VALVE WITH ACTUATOR			
1	BYPV	BYPASS VALVE WITH ACTUATOR			
1	PU-1	VARIABLE FREQUENCY DRIVE (VFD)			
1	LEAK	LEAK DETECTION SENSOR			
1	CHWM	CHILLED WATER MONITOR			

POINTS LIST

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Schedule	Trend	Alarm	Graphic
VCHWST	CRB_00_OB23_HVA_CHW_VCHWST	Valved Chilled Water Supply Temperature	TEMP SENSOR	X								X		X
PCHWRT	CRB_00_OB23_HVA_CHW_PCHWRT	Plant Chilled Water Return Temperature	TEMP SENSOR	X								X		X
BCHWST	CRB_00_OB23_HVA_CHW_BCHWST	Building Chilled Water Supply Temperature	TEMP SENSOR	X								X		X
BCHWRT	CRB_00_OB23_HVA_CHW_BCHWRT	Building Chilled Water Return Temperature	TEMP SENSOR	X								X		X
BCHWT	CRB_00_OB23_HVA_CHW_BCHWT	Bypass Chilled Water Temperature	TEMP SENSOR	X								X		X
OAT	CRB_00_OB23_HVA_CHW_OAT	Local Outside Air Temperature	TEMP SENSOR	X								X		X
BCHWF	CRB_00_OB23_HVA_CHW_BCHWF	Building Chilled Water Supply Flow	FLOW SENSOR	X								X		X
PCHWSP	CRB_00_OB23_HVA_CHW_PCHWSP	Plant Chilled Water Supply Pressure	STATIC PRESS SENSOR	X								X		X
PCHWRP	CRB_00_OB23_HVA_CHW_PCHWRT	Plant Chilled Water Return Pressure	STATIC PRESS SENSOR	X								X		X
DCHWP	CRB_00_OB23_HVA_CHW_DCHWSP	Downstream Chilled Water Pressure	STATIC PRESS SENSOR	X								X		X
BCHWSP	CRB_00_OB23_HVA_CHW_BCHWSP	Building Chilled Water Supply Pressure	STATIC PRESS SENSOR	X								X		X
CHWDP	CRB_00_OB23_HVA_CHW_CHWDP	Chilled Water Differential Pressure	DIFF PRESS SENSOR	X								X		X
PCHWV	CRB_00_OB23_HVA_CHW_PCHWV	Plant Chilled Water Valve	DC VOLTAGE OUTPUT		X							X		X
BYPV	CRB_00_OB23_HVA_CHW_BYPV	Chilled Water Bypass Valve	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_OB23_HVA_CHWP1_SPD	Chilled Water Pump PU-1 VFD Speed	DC VOLTAGE OUTPUT		X							X		X
MEZVLV	CRB_00_OB23_HVA_CHW_MEZVLV	Building Chilled Water Supply Valve - To Mezzanine AHU	DC VOLTAGE OUTPUT		X									X
CRBVLV	CRB_00_OB23_HVA_CHW_CRBVLV	Building Chilled Water Supply Valve - To White Hall	DC VOLTAGE OUTPUT		X									X
STS	CRB_00_OB23_HVA_CHWP1_STS	Chilled Water Pump PU-1 Running Status	DRY CONTACT			X						X	X	X
ALM	CRB_00_OB23_HVA_CHWP1_ALM	Chilled Water Pump PU-1 VFD Fault	DRY CONTACT			X						X	X	X
LEAK	CRB_00_OB23_HVA_CHW_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_OB23_HVA_CHW_LEAKTRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
CMD	CRB_00_OB23_HVA_CHWP1_CMD	Chilled Water Pump PU-1 Enable	RELAY COIL				X					X		X
CHWMST	CRB_00_OB23_HVA_CHWM_CHWMST	Chilled Water Monitor Supply Temperature	INTEGRATED INTO CHW MONITOR					X				X		X
CHWMRT	CRB_00_OB23_HVA_CHWM_CHWMRT	Chilled Water Monitor Return Temperature	INTEGRATED INTO CHW MONITOR					X				X		X
CHWMSF	CRB_00_OB23_HVA_CHWM_CHWMF	Chilled Water Monitor Flow	INTEGRATED INTO CHW MONITOR					X				X		X
SOAT	CRB_00_OB23_HVA_SOAT	Outside Air Temperature (shared through BAS)	NONE					X				X		X
N/A	CRB_00_OB23_HVA_BCWHRT_SPT	Building Chilled Water Return Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_BCHWST_MAXSPT	Building Chilled Water Maximum Supply Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_BCHWST_HIALM	Building Chilled Water Supply High Temperature Alarm & Setpoint	NONE					X				X	X	X
N/A	CRB_00_OB23_HVA_BCHWST_LOALM	Building Chilled Water Supply Low Temperature Alarm & Setpoint	NONE					X				X	X	X
N/A	CRB_00_OB23_HVA_VCHWST_SPT	Valved Chilled Water Supply Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_CHWM_BTU	Chilled Water Monitor Energy Total	NONE					X				X		X
N/A	CRB_00_OB23_HVA_CHWM_TOTFLOW	Chilled Water Monitor Totalized Flow	NONE					X				X		X
N/A	CRB_00_OB23_HVA_PU1_ALM	Pump PU-1 Failure	NONE						X			X	X	X
N/A	CRB_00_OB23_HVA_PU1_HAND	Pump PU-1 in Hand	NONE						X			X	X	X
N/A	CRB_00_OB23_HVA_PU1_RTALM	Pump PU-1 Runtime Exceeded	NONE						X			X	X	X

SEQUENCE

SYSTEM DESCRIPTION

The building chilled water system is located in the Patterson Office Tower basement mechanical room, OB023. The building chilled water system feeds the Patterson Office Tower chilled water plate system, the Patterson Office Tower Mezzanine AHU, and White Hall.

GLOBAL OUTDOOR AIR SENSOR

The system shall use UK global sensor as the primary outdoor temperature reading. If the sensor fails or if communication is lost, the local sensor shall be used as backup.

SYSTEM ENABLE

The cooling system shall automatically be enabled when chilled water is available and when any of the air handling units (AHU-1, AHU-2, AHU-3, AHU-4, Mezzanine AHU) are calling for mechanical cooling (or dehumidification), or the POT chilled water plate system is enabled. When the valved chilled water supply temperature (VCHWST) is equal to, or less than, the valved chilled water supply temperature setpoint (adj.), chilled water shall be considered available.

Provide a manual override that will allow operators to manually enable and disable the system.

Provide lockout for outside air temperatures below 35°F (adj) that can be enabled or disabled by operator.

CHILLED WATER PUMP

The chilled water pump shall start when the system is enabled. The pump speed signal will be limited from rising above 25% until the pump status has proven ready to run. The variable frequency drive will be modulated to maintain the chilled water differential pressure (CHWDP) at setpoint (adj.).

Provide a network input that will allow operators to manually enable and disable the chilled water pump.

Chilled Water Pump Alarms shall be provided as follows:

Pump Failure: Commanded on, but the run status is off.

Pump Running in hand: Commanded off, but the run status is on.

Pump Runtime exceeded: Status runtime exceeds a user definable limit.

Pump VFD Fault: The chilled water pump VFD alarm is enabled.

CHILLED WATER TEMPERATURE CONTROL

When the system is enabled, the primary chilled water valve (PCHWV) will be modulated to maintain the building chilled water return temperature at setpoint (adj). If the building chilled water supply temperature rises above the maximum supply water temperature setpoint (adj) the primary chilled water valve control loop will be disabled. The primary chilled water valve shall fully open to maintain the building chilled water supply temperature at the maximum building chilled water supply temperature setpoint. The primary chilled water valve control loop shall be re-enabled once the building chilled water supply temperature has dropped below the maximum supply water temperature setpoint minus a 5°F (adj.) differential.

Setup a reset schedule based on the campus shared Outdoor Air Temp for the building chilled water supply and return temperatures. Setpoints to be determined during the testing and balancing phase to meet actual field requirements.

CHILLED WATER DIFFERENTIAL PRESSURE RESET CONTROL

Differential pressure shall be reset based on the AHU (AHU-1, AHU-2, AHU-3, and Mezzanine AHU) cooling coil valve positions. Pressure shall be reset such that the cooling control valve maximum position is operating at 80% (adj) at all times.

Provide a network input that will allow operators to manually enable / disable the differential pressure reset control. If disabled, the chilled water pump will control from a fixed chilled water differential pressure setpoint.

The primary chilled water bypass valve (BYPV) will be manually controlled by the building operators through the FMS. This valve will remain closed in normal operation and water will blend from return to supply through the check valve. The only time this valve should be opened is if more flow is needed by a plant (flow from supply to return).

CHILLED WATER TAKEOFF VALVES

The chilled water takeoff valves shall be controlled as follows:

Mezzanine AHU Valve (MEZVLV) - The Mezzanine AHU valve shall open when the Mezzanine AHU is calling for mechanical cooling. The existing Mezzanine AHU cooling valve output signal shall be passed to the new chilled water TIER 1 controller. If the Mezzanine AHU cooling valve output signal is greater than 1%, the Mezzanine AHU shall be considered calling for cooling.

White Hall Valve (CRBVLV) - The White Hall valve (CRBVLV) shall open when any of the White Hall AHUs are calling for mechanical cooling or when any of the AHUs are in dehumidification mode.

Provide network inputs that will allow operators to manually open and close each takeoff valve.

CHILLED WATER MONITORING

A building chilled water energy metering system shall be installed on any facility connected to the UK Central Chilled Water System such that all chilled water used by the facility is metered. Flow and temperature sensors shall be connected to a local microprocessor-based digital BTU meter display. This meter shall calculate energy flow (in BTUs) and report that value, along with the instantaneous flow rates and temperatures to the Facility Management System (FMS). Flow display device shall communicate to the FMS via BACnet IP. The following data points shall be visible locally from the display and reported to the FMS:

Energy Total (BTU)

Instantaneous Water Flow (GPM)

Flow Total (Gallons)

Supply and Return Temperatures (°F)

An insertion electromagnetic flow meter shall be provided to monitor chilled water flow. An ultrasonic meter may be applied where piping straight runs, obstructions, or pricing prevent accurate measurement by an insertion electromagnetic meter. Flow meter shall be installed in either supply (preferred) or return piping of the system. Insertion type flow meter shall be provided with all hardware necessary to enable manual insertion and removal of the meter without system shutdown.

Approved meters:

Onicon F-3500 with Onicon System-10 BTU display - To be used in adequate straight run pipe length (10 diameters upstream, 5 diameters downstream) situations. Switch vertically mounted in horizontal pipe, or switch horizontally mounted in vertical pipe with flow up.

Flexim FLUXUS Type F722 with Onicon System 10-BTU display - To be used in reduced straight pipe length situations and where pipe diameter is greater than 4". Mount in horizontal pipe.

Flexim FLUXUS Type F721TE - To be used in adequate straight run pipe length situations and where pipe diameter is greater than 20". Mount in horizontal pipe.

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UNIVERSITY OF KENTUCKY
WHITE HALL RENOVATION
LEXINGTON, KENTUCKY

CHILLED WATER SYSTEM

JOB NO.	2302
DATE	02/2024
DRAWN	TCC
CHECKED	RTM

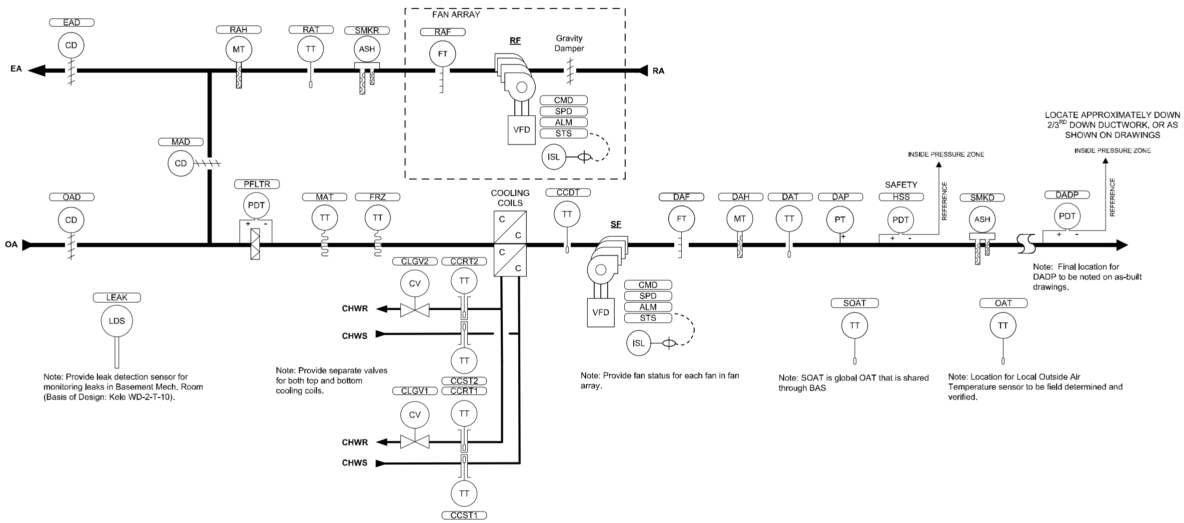
REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC6.04

FLOW DIAGRAM



SEQUENCE

GLOBAL OUTDOOR SENSOR

The system shall use the UK global outdoor air sensor as the primary outdoor temperature reading. If the sensor fails, or communication is lost, the local outdoor air sensor shall be used as backup.

RUN CONDITIONS

The unit shall run whenever one of the below conditions is true and the unit is not shutdown on any safeties.

The schedule is "Occupied" and at least one zone occupancy sensor has been registered as "Occupied" for a minimum of 10 minutes (adj.)

The schedule is "Unoccupied" and the maximum zone humidity (ZMH) measures above the Unoccupied Humidity setpoint of 55% RH (adj.) for a minimum duration of 10 minutes (adj.).

The schedule is "Unoccupied" and the zone average temperature (ZAT) is above the Unoccupied Cooling Setpoint (UNOCCCLG_SPT).

Morning cool-down mode is enabled.

The zone average temperature and maximum zone humidity shall both use a primary-failsafe scheme. If the primary value (ZAT / ZMH) cannot be read across the network, the last known value shall continue to be used for 15 minutes (adj.). If the primary value cannot be read after 15 minutes (adj.) a failsafe value shall be used. When the primary value is restored, there will be a 15 minute (adj.) delay before the hot water system reverts back to using the primary value.

A network signal shall be provided that will allow the unit to bypass the schedule and be manually commanded on or off.

MORNING COOL-DOWN

Morning cool-down shall be enabled only when the unit has started early, prior to the time schedule as a result of optimized start feature. Morning cool-down mode shall be enabled when the zone average temperature is above the morning cool-down setpoint (MRNNCLG_SPT), 75°F (adj.). Morning cool-down mode shall be disabled when the zone average temperature rises above 72°F (adj.).

DISCHARGE AIR TEMPERATURE CONTROL

The outside air damper, mixed air damper, exhaust air damper, and cooling coil valve shall modulate, as part of the discharge temperature control strategy, to maintain the discharge air temperature at the discharge air temperature setpoint.

Provide a discharge air temperature reset. The discharge air temperature setpoint shall reset based on zone average temperature as follows:

ZAT = 75°F (adj). DAT = 55°F (adj.)

ZAT = 70°F (adj.) DAT = 65°F (adj.)

Provide a network input that will allow operators to manually enable /disable the discharge air temperature reset control. If the temperature reset is disabled, the unit will control using a fixed discharge air temperature setpoint.

ECONOMIZER AND OUTSIDE AIR DAMPER

When the unit is enabled, and the outside air temperature is less than the Economizer Setpoint (ECON_SP), 68°F the outside air damper shall utilize free cooling. The outside air damper shall modulate between the minimum outside air damper position (MINOAD_SPT) and 100% open to maintain the discharge air temperature at setpoint.

When the outside air temperature is above the Economizer Setpoint (ECON_SP), the outside air damper shall be indexed to the minimum outside air damper position.

The outside air dampers shall maintain a minimum position while the unit is enabled, unless the mixed air low limit control loop is active. If the mixed air low limit control loop is active, the outside air damper shall be allowed to close past the minimum outside air damper position. The minimum outside air damper position shall be determined during the commissioning period to meet the requirements of actual field conditions.

If the unit is in morning warm-up, or cycling during unoccupied periods, the outside air damper shall remain closed.

MIXED AIR DAMPER

The mixed air damper (MAD) shall inversely follow the outside air damper and modulate to maintain the discharge air temperature at the discharge air temperature setpoint (adj.).

Provide a mixed air low limit control loop. The mixed air low limit control loop will override the discharge air temperature control loop when the mixed air temperature is less than or equal to the mixed air low limit setpoint (MATLL_SPT), 47°F (adj.). The mixed air low limit control loop shall allow the outside air damper to close past the minimum outside air damper position.

SUPPLY FAN CONTROL

The variable speed supply fan(s) (SF) shall be enabled after the outside air damper status has proven open, unless the unit is shutdown on safeties. When the supply fan status (STS) indicates the fan has started, the control sequence shall be enabled.

The supply fan(s) shall modulate speed to maintain duct static pressure (DADP) at setpoint. Upon loss of airflow, the system will send an alarm to the BAS.

To prevent short cycling, the supply fan(s) shall have adjustable minimum run and off times. The minimum adjustable run and off times shall be adjusted during the commissioning period to meet the requirements of actual field conditions

Provide run indication for each fan in the fan wall assembly

Alarms shall be provided as follows:

FAN FAILURE: Fan commanded on, but the status is off.

FAN IN HAND: Fan commanded off, but the status is on.

RETURN FAN CONTROL

The variable speed return fan (RF) shall be started after the supply fan status has proven "On". The return fan will modulate in conjunction with the supply fan.

The return fan speed will modulate to maintain an offset between the discharge air flow (DAF) and return air flow (RAF). The offset percentage shall be adjusted during the commissioning period to meet the requirements of actual field conditions.

Provide run indication for each fan in the unit.

COOLING COILS

The cooling coil valves shall be enabled whenever:

The outside air temperature is greater than 55°F (adj.)

And the supply fan status is on.

The economizer is disabled, or the outside air damper is open 100% if the economizer is enabled.

The cooling coil valves shall modulate to maintain the discharge air temperature at the discharge air temperature setpoint. The bottom cooling coil valve shall be fully open before the top cooling coil valve begins to open.

DEHUMIDIFICATION

Dehumidification shall be enabled when the maximum zone humidity (ZMH) rises above the humidity setpoint of 55% RH (adj.). Dehumidification mode shall be disabled when ZMH falls below the setpoint, minus 8% RH differential (adj.).

When dehumidification is active, the cooling coil valve shall modulate to maintain the cooling coil discharge temperature (CCDT) at 55°F (adj.).

When dehumidification is enabled, an enable signal shall be sent to the chilled water systems.

If the unit is enabled for unoccupied dehumidification, all associated VAVs shall be indexed to "Occupied".

Provide a network input that will allow operators to manually enable and disable dehumidification mode.

UNIT PROTECTION

Freezestat Alarm (FRZ) - When the freezestat low temperature switch is activated, a freezestat alarm will be generated. When in alarm:

The fans will be disabled via a hard-wired shutdown circuit

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

High Static Shutdown (HSS) - The unit will be disabled if the high static pressure switch is activated.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Discharge Air Smoke Detector (SMKD) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Return Air Smoke Detector (SMKR) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Filter Change Required - A warning, signaling a filer change, will be generated when the differential pressure across the filter exceeds 1inWC (adj.)

Leak Detection (LEAK) – Provide a leak detection sensor (Basis of Design: Kele WD-2-T-10) for monitoring the unit coils. Upon leak detection, an alarm shall be issued to the BAS but the unit shall remain enabled. Provide alarms for the following:

Leak Detection

Failure of leak detection sensor integrity test

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LEXINGTON, KENTUCKY

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JOB NO.	2302
DATE	5/22/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
DD		FEB 7, 2024

SHEET

IC6.07

BILL OF MATERIALS

Qty	Device Tag	Description	Furnished By	Installed By	Wired and Terminated By
1	DADP	DIFF PRESSURE SENSOR	CONTRACTOR	CONTRACTOR	CONTRACTOR
1	PFLTR	DIFF PRESSURE SENSOR			
1	DAP	STATIC PRESSURE SENSOR			
1	OAT	TEMPERATURE TRANSMITTER			
1	MAT	TEMPERATURE TRANSMITTER			
1	DAT	TEMPERATURE TRANSMITTER			
1	RAT	TEMPERATURE TRANSMITTER			
1	CCST1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCST2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCDT	TEMPERATURE TRANSMITTER			
1	DAH	HUMIDITY SENSOR			
1	RAH	HUMIDITY SENSOR			
1	DAF	AIRFLOW SENSOR			
1	RAF	AIRFLOW SENSOR			
1	HSS	HIGH PRESSURE SWITCH			
1	OAD	OUTSIDE AIR DAMPER			
1	MAD	MIXED AIR DAMPER			
1	EAD	EXHAUST AIR DAMPER			
1	SF	SUPPLY FAN WITH VFD			
1	CLGV1	COOLING VALVE			
1	CLGV2	COOLING VALVE			
1	RF	RETURN AIR FAN WITH VFD			
1	LEAK	LEAK DETECTION SENSOR			
1	SMKD	SMOKE DETECTOR			
1	SMKR	SMOKE DETECTOR			
8	ISL	CURRENT SWITCH			

POINTS LIST

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU1_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU1_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU1_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU1_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU1_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU1_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU1_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU1_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU1_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU1_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU1_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU1_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU1_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU1_DAF	Discharge Air Flow	AIRFLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU1_RAF	Return Air Flow	AIRFLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU1_OAF	Outside Air Flow	AIRFLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU1_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU1_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU1_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU1_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU1_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU1_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU1_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximuim Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_MAU1_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_MAU1_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

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AHU-1
BILL OF MATERIALS AND POINTS

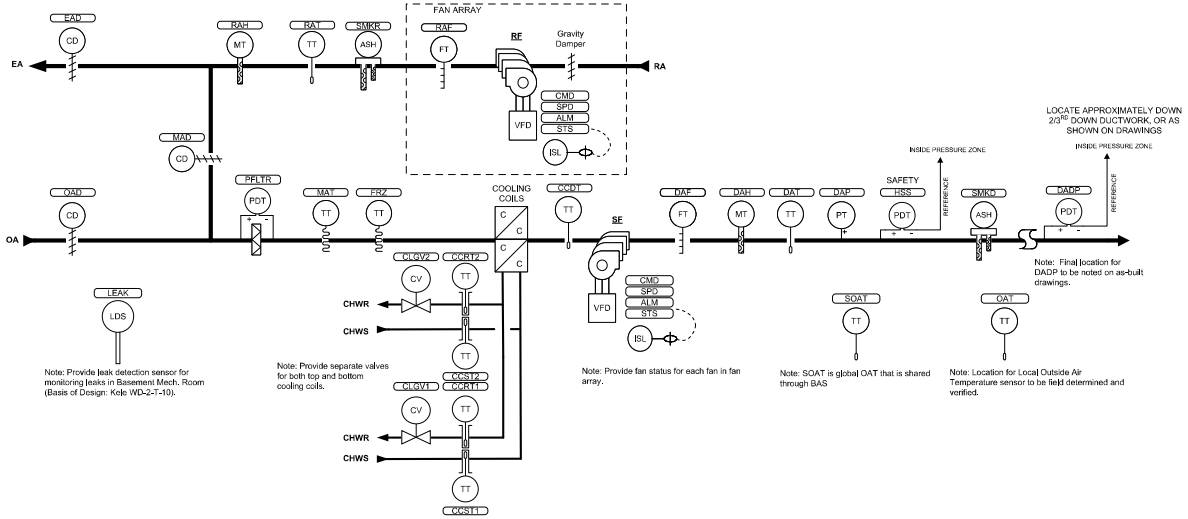
JOB NO.	2302
DATE	5/22/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
DD		FEB 7, 2024

SHEET
IC6.08

FLOW DIAGRAM



SEQUENCE

GLOBAL OUTDOOR SENSOR

The system shall use the UK global outdoor air sensor as the primary outdoor temperature reading. If the sensor fails, or communication is lost, the local outdoor air sensor shall be used as backup.

RUN CONDITIONS

The unit shall run whenever one of the below conditions is true and the unit is not shutdown on any safeties.

The schedule is "Occupied" and at least one zone occupancy sensor has been registered as "Occupied" for a minimum of 10 minutes (adj.)

The schedule is "Unoccupied" and the maximum zone humidity (ZMH) measures above the Unoccupied Humidity setpoint of 55% RH (adj.) for a minimum duration of 10 minutes (adj.).

The schedule is "Unoccupied" and the zone average temperature (ZAT) is above the Unoccupied Cooling Setpoint (UNOCCCLG_SPT).

Morning cool-down mode is enabled.

The zone average temperature and maximum zone humidity shall both use a primary-failsafe scheme. If the primary value (ZAT / ZMH) cannot be read across the network, the last known value shall continue to be used for 15 minutes (adj.). If the primary value cannot be read after 15 minutes (adj.) a failsafe value shall be used. When the primary value is restored, there will be a 15 minute (adj.) delay before the hot water system reverts back to using the primary value.

A network signal shall be provided that will allow the unit to bypass the schedule and be manually commanded on or off.

MORNING COOL-DOWN

Morning cool-down shall be enabled only when the unit has started early, prior to the time schedule as a result of optimized start feature. Morning cool-down mode shall be enabled when the zone average temperature is above the morning cool-down setpoint (MRNNCLG_SPT), 75°F (adj.). Morning cool-down mode shall be disabled when the zone average temperature rises above 72°F (adj.).

DISCHARGE AIR TEMPERATURE CONTROL

The outside air damper, mixed air damper, exhaust air damper, and cooling coil valve shall modulate, as part of the discharge temperature control strategy, to maintain the discharge air temperature at the discharge air temperature setpoint.

Provide a discharge air temperature reset. The discharge air temperature setpoint shall reset based on zone average temperature as follows:

ZAT = 75°F (adj). DAT = 55°F (adj.)

ZAT = 70°F (adj.) DAT = 65°F (adj.)

Provide a network input that will allow operators to manually enable /disable the discharge air temperature reset control. If the temperature reset is disabled, the unit will control using a fixed discharge air temperature setpoint.

ECONOMIZER AND OUTSIDE AIR DAMPER

When the unit is enabled, and the outside air temperature is less than the Economizer Setpoint (ECON_SP), 68°F the outside air damper shall utilize free cooling. The outside air damper shall modulate between the minimum outside air damper position (MINOAD_SPT) and 100% open to maintain the discharge air temperature at setpoint.

When the outside air temperature is above the Economizer Setpoint (ECON_SP), the outside air damper shall be indexed to the minimum outside air damper position.

The outside air dampers shall maintain a minimum position while the unit is enabled, unless the mixed air low limit control loop is active. If the mixed air low limit control loop is active, the outside air damper shall be allowed to close past the minimum outside air damper position. The minimum outside air damper position shall be determined during the commissioning period to meet the requirements of actual field conditions.

If the unit is in morning warm-up, or cycling during unoccupied periods, the outside air damper shall remain closed.

MIXED AIR DAMPER

The mixed air damper (MAD) shall inversely follow the outside air damper and modulate to maintain the discharge air temperature at the discharge air temperature setpoint (adj.).

Provide a mixed air low limit control loop. The mixed air low limit control loop will override the discharge air temperature control loop when the mixed air temperature is less than or equal to the mixed air low limit setpoint (MATLL_SPT), 47°F (adj.). The mixed air low limit control loop shall allow the outside air damper to close past the minimum outside air damper position.

SUPPLY FAN CONTROL

The variable speed supply fan(s) (SF) shall be enabled after the outside air damper status has proven open, unless the unit is shutdown on safeties. When the supply fan status (STS) indicates the fan has started, the control sequence shall be enabled.

The supply fan(s) shall modulate speed to maintain duct static pressure (DADP) at setpoint. Upon loss of airflow, the system will send an alarm to the BAS.

To prevent short cycling, the supply fan(s) shall have adjustable minimum run and off times. The minimum adjustable run and off times shall be adjusted during the commissioning period to meet the requirements of actual field conditions

Provide run indication for each fan in the fan wall assembly

Alarms shall be provided as follows:

FAN FAILURE: Fan commanded on, but the status is off.

FAN IN HAND: Fan commanded off, but the status is on.

RETURN FAN CONTROL

The variable speed return fan (RF) shall be started after the supply fan status has proven "On". The return fan will modulate in conjunction with the supply fan.

The return fan speed will modulate to maintain an offset between the discharge air flow (DAF) and return air flow (RAF). The offset percentage shall be adjusted during the commissioning period to meet the requirements of actual field conditions.

Provide run indication for each fan in the unit.

COOLING COILS

The cooling coil valves shall be enabled whenever:

The outside air temperature is greater than 55°F (adj.)

And the supply fan status is on.

The economizer is disabled, or the outside air damper is open 100% if the economizer is enabled.

The cooling coil valves shall modulate to maintain the discharge air temperature at the discharge air temperature setpoint. The bottom cooling coil valve shall be fully open before the top cooling coil valve begins to open.

DEHUMIDIFICATION

Dehumidification shall be enabled when the maximum zone humidity (ZMH) rises above the humidity setpoint of 55% RH (adj.). Dehumidification mode shall be disabled when ZMH falls below the setpoint, minus 8% RH differential (adj.).

When dehumidification is active, the cooling coil valve shall modulate to maintain the cooling coil discharge temperature (CCDT) at 55°F (adj.).

When dehumidification is enabled, an enable signal shall be sent to the chilled water systems.

If the unit is enabled for unoccupied dehumidification, all associated VAVs shall be indexed to "Occupied".

Provide a network input that will allow operators to manually enable and disable dehumidification mode.

UNIT PROTECTION

Freezestat Alarm (FRZ) - When the freezestat low temperature switch is activated, a freezestat alarm will be generated. When in alarm:

The fans will be disabled via a hard-wired shutdown circuit

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

High Static Shutdown (HSS) - The unit will be disabled if the high static pressure switch is activated.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Discharge Air Smoke Detector (SMKD) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Return Air Smoke Detector (SMKR) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Filter Change Required - A warning, signaling a filer change, will be generated when the differential pressure across the filter exceeds 1inWC (adj.)

Leak Detection (LEAK) – Provide a leak detection sensor (Basis of Design: Kele WD-2-T-10) for monitoring the unit coils. Upon leak detection, an alarm shall be issued to the BAS but the unit shall remain enabled. Provide alarms for the following:

Leak Detection

Failure of leak detection sensor integrity test

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CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC6.09

BILL OF MATERIALS

Qty	Device Tag	Description	Furnished By	Installed By	Wired and Terminated By
1	DADP	DIFF PRESSURE SENSOR	CONTRACTOR	CONTRACTOR	CONTRACTOR
1	PFLTR	DIFF PRESSURE SENSOR			
1	DAP	STATIC PRESSURE SENSOR			
1	OAT	TEMPERATURE TRANSMITTER			
1	MAT	TEMPERATURE TRANSMITTER			
1	DAT	TEMPERATURE TRANSMITTER			
1	RAT	TEMPERATURE TRANSMITTER			
1	CCST1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCST2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCDT	TEMPERATURE TRANSMITTER			
1	DAH	HUMIDITY SENSOR			
1	RAH	HUMIDITY SENSOR			
1	DAF	AIRFLOW SENSOR			
1	RAF	AIRFLOW SENSOR			
1	HSS	HIGH PRESSURE SWITCH			
1	OAD	OUTSIDE AIR DAMPER			
1	MAD	MIXED AIR DAMPER			
1	EAD	EXHAUST AIR DAMPER			
1	SF	SUPPLY FAN WITH VFD			
1	CLGV1	COOLING VALVE			
1	CLGV2	COOLING VALVE			
1	RF	RETURN AIR FAN WITH VFD			
1	LEAK	LEAK DETECTION SENSOR			
1	SMKD	SMOKE DETECTOR			
1	SMKR	SMOKE DETECTOR			
8	ISL	CURRENT SWITCH			

POINTS LIST

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU2_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU2_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU2_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU2_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU2_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU2_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU2_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU2_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU2_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU2_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU2_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU2_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU2_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU2_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU2_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU2_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU2_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU2_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU2_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU2_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU2_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU2_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU2_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_MAU1_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_MAU1_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

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AHU-2
BILL OF MATERIALS AND POINTS

JOB NO.	2302
DATE	02/2024
DRAWN	TCC
CHECKED	RTM

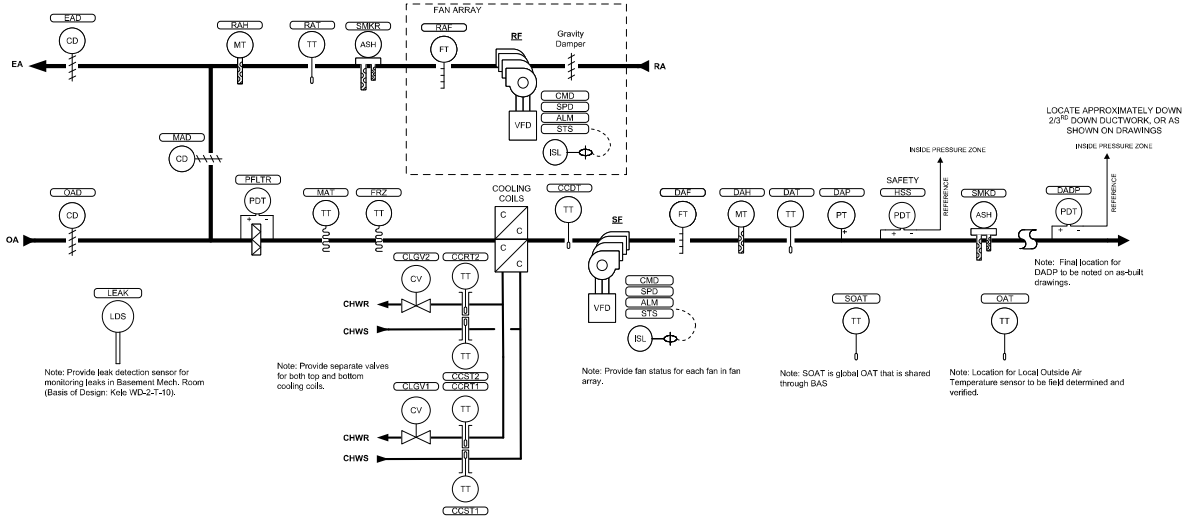
REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC6.10

FLOW DIAGRAM



SEQUENCE

GLOBAL OUTDOOR SENSOR

The system shall use the UK global outdoor air sensor as the primary outdoor temperature reading. If the sensor fails, or communication is lost, the local outdoor air sensor shall be used as backup.

RUN CONDITIONS

The unit shall run whenever one of the below conditions is true and the unit is not shutdown on any safeties.

The schedule is "Occupied" and at least one zone occupancy sensor has been registered as "Occupied" for a minimum of 10 minutes (adj.)

The schedule is "Unoccupied" and the maximum zone humidity (ZMH) measures above the Unoccupied Humidity setpoint of 55% RH (adj.) for a minimum duration of 10 minutes (adj.).

The schedule is "Unoccupied" and the zone average temperature (ZAT) is above the Unoccupied Cooling Setpoint (UNOCCCLG_SPT).

Morning cool-down mode is enabled.

The zone average temperature and maximum zone humidity shall both use a primary-failsafe scheme. If the primary value (ZAT / ZMH) cannot be read across the network, the last known value shall continue to be used for 15 minutes (adj.). If the primary value cannot be read after 15 minutes (adj.) a failsafe value shall be used. When the primary value is restored, there will be a 15 minute (adj.) delay before the hot water system reverts back to using the primary value.

A network signal shall be provided that will allow the unit to bypass the schedule and be manually commanded on or off.

MORNING COOL-DOWN

Morning cool-down shall be enabled only when the unit has started early, prior to the time schedule as a result of optimized start feature. Morning cool-down mode shall be enabled when the zone average temperature is above the morning cool-down setpoint (MRNNCLG_SPT), 75°F (adj.). Morning cool-down mode shall be disabled when the zone average temperature rises above 72°F (adj.).

DISCHARGE AIR TEMPERATURE CONTROL

The outside air damper, mixed air damper, exhaust air damper, and cooling coil valve shall modulate, as part of the discharge temperature control strategy, to maintain the discharge air temperature at the discharge air temperature setpoint.

Provide a discharge air temperature reset. The discharge air temperature setpoint shall reset based on zone average temperature as follows:

ZAT = 75°F (adj). DAT = 55°F (adj.)

ZAT = 70°F (adj.) DAT = 65°F (adj.)

Provide a network input that will allow operators to manually enable /disable the discharge air temperature reset control. If the temperature reset is disabled, the unit will control using a fixed discharge air temperature setpoint.

ECONOMIZER AND OUTSIDE AIR DAMPER

When the unit is enabled, and the outside air temperature is less than the Economizer Setpoint (ECON_SP), 68°F the outside air damper shall utilize free cooling. The outside air damper shall modulate between the minimum outside air damper position (MINOAD_SPT) and 100% open to maintain the discharge air temperature at setpoint.

When the outside air temperature is above the Economizer Setpoint (ECON_SP), the outside air damper shall be indexed to the minimum outside air damper position.

The outside air dampers shall maintain a minimum position while the unit is enabled, unless the mixed air low limit control loop is active. If the mixed air low limit control loop is active, the outside air damper shall be allowed to close past the minimum outside air damper position. The minimum outside air damper position shall be determined during the commissioning period to meet the requirements of actual field conditions.

If the unit is in morning warm-up, or cycling during unoccupied periods, the outside air damper shall remain closed.

MIXED AIR DAMPER

The mixed air damper (MAD) shall inversely follow the outside air damper and modulate to maintain the discharge air temperature at the discharge air temperature setpoint (adj.).

Provide a mixed air low limit control loop. The mixed air low limit control loop will override the discharge air temperature control loop when the mixed air temperature is less than or equal to the mixed air low limit setpoint (MATLL_SPT), 47°F (adj.). The mixed air low limit control loop shall allow the outside air damper to close past the minimum outside air damper position.

SUPPLY FAN CONTROL

The variable speed supply fan(s) (SF) shall be enabled after the outside air damper status has proven open, unless the unit is shutdown on safeties. When the supply fan status (STS) indicates the fan has started, the control sequence shall be enabled.

The supply fan(s) shall modulate speed to maintain duct static pressure (DADP) at setpoint. Upon loss of airflow, the system will send an alarm to the BAS.

To prevent short cycling, the supply fan(s) shall have adjustable minimum run and off times. The minimum adjustable run and off times shall be adjusted during the commissioning period to meet the requirements of actual field conditions

Provide run indication for each fan in the fan wall assembly

Alarms shall be provided as follows:

FAN FAILURE: Fan commanded on, but the status is off.

FAN IN HAND: Fan commanded off, but the status is on.

RETURN FAN CONTROL

The variable speed return fan (RF) shall be started after the supply fan status has proven "On". The return fan will modulate in conjunction with the supply fan.

The return fan speed will modulate to maintain an offset between the discharge air flow (DAF) and return air flow (RAF). The offset percentage shall be adjusted during the commissioning period to meet the requirements of actual field conditions.

Provide run indication for each fan in the unit.

COOLING COILS

The cooling coil valves shall be enabled whenever:

The outside air temperature is greater than 55°F (adj.)

And the supply fan status is on.

The economizer is disabled, or the outside air damper is open 100% if the economizer is enabled.

The cooling coil valves shall modulate to maintain the discharge air temperature at the discharge air temperature setpoint. The bottom cooling coil valve shall be fully open before the top cooling coil valve begins to open.

DEHUMIDIFICATION

Dehumidification shall be enabled when the maximum zone humidity (ZMH) rises above the humidity setpoint of 55% RH (adj.). Dehumidification mode shall be disabled when ZMH falls below the setpoint, minus 8% RH differential (adj.).

When dehumidification is active, the cooling coil valve shall modulate to maintain the cooling coil discharge temperature (CCDT) at 55°F (adj.).

When dehumidification is enabled, an enable signal shall be sent to the chilled water systems.

If the unit is enabled for unoccupied dehumidification, all associated VAVs shall be indexed to "Occupied".

Provide a network input that will allow operators to manually enable and disable dehumidification mode.

UNIT PROTECTION

Freezestat Alarm (FRZ) - When the freezestat low temperature switch is activated, a freezestat alarm will be generated. When in alarm:

The fans will be disabled via a hard-wired shutdown circuit

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

High Static Shutdown (HSS) - The unit will be disabled if the high static pressure switch is activated.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Discharge Air Smoke Detector (SMKD) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Return Air Smoke Detector (SMKR) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Filter Change Required - A warning, signaling a filer change, will be generated when the differential pressure across the filter exceeds 1inWC (adj.)

Leak Detection (LEAK) – Provide a leak detection sensor (Basis of Design: Kele WD-2-T-10) for monitoring the unit coils. Upon leak detection, an alarm shall be issued to the BAS but the unit shall remain enabled. Provide alarms for the following:

Leak Detection

Failure of leak detection sensor integrity test

SHERMAN CARTER BARNHART ARCHITECTS

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AHU-1

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC6.11

BILL OF MATERIALS

Qty	Device Tag	Description	Furnished By	Installed By	Wired and Terminated By
1	DADP	DIFF PRESSURE SENSOR	CONTRACTOR	CONTRACTOR	CONTRACTOR
1	PFLTR	DIFF PRESSURE SENSOR			
1	DAP	STATIC PRESSURE SENSOR			
1	OAT	TEMPERATURE TRANSMITTER			
1	MAT	TEMPERATURE TRANSMITTER			
1	DAT	TEMPERATURE TRANSMITTER			
1	RAT	TEMPERATURE TRANSMITTER			
1	CCST1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCST2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCDT	TEMPERATURE TRANSMITTER			
1	DAH	HUMIDITY SENSOR			
1	RAH	HUMIDITY SENSOR			
1	DAF	AIRFLOW SENSOR			
1	RAF	AIRFLOW SENSOR			
1	HSS	HIGH PRESSURE SWITCH			
1	OAD	OUTSIDE AIR DAMPER			
1	MAD	MIXED AIR DAMPER			
1	EAD	EXHAUST AIR DAMPER			
1	SF	SUPPLY FAN WITH VFD			
1	CLGV1	COOLING VALVE			
1	CLGV2	COOLING VALVE			
1	RF	RETURN AIR FAN WITH VFD			
1	LEAK	LEAK DETECTION SENSOR			
1	SMKD	SMOKE DETECTOR			
1	SMKR	SMOKE DETECTOR			
8	ISL	CURRENT SWITCH			

POINTS LIST

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU3_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU3_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU3_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU3_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU3_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU3_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU3_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU3_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU3_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU3_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU3_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU3_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU3_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU3_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU3_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU3_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU3_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU3_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU3_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU3_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU3_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU3_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU3_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_AHU3_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_AHU3_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

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AHU-3
BILL OF MATERIALS AND POINTS

JOB NO.	2302
DATE	02/2024
DRAWN	TCC
CHECKED	RTM

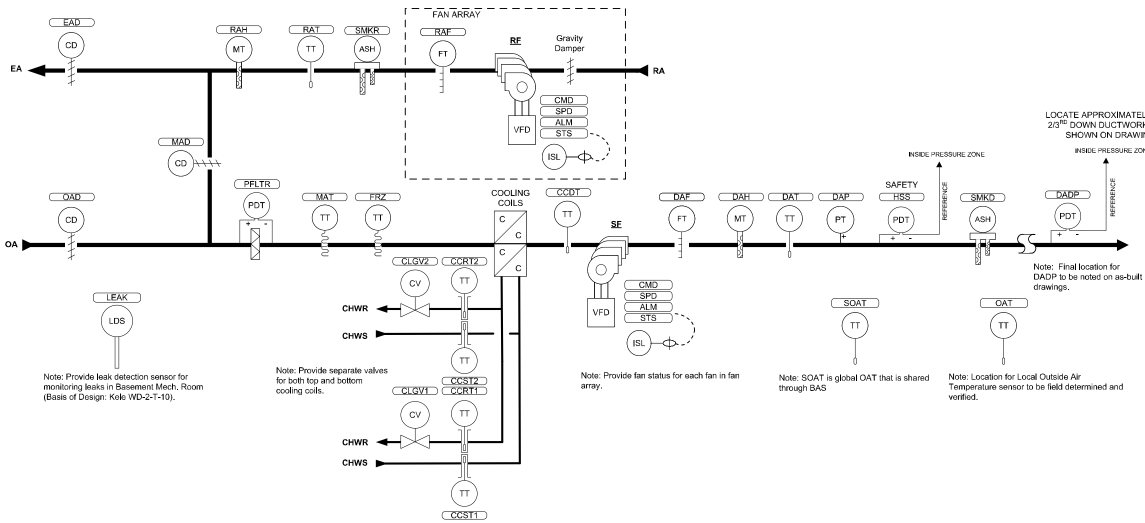
REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC6.12

FLOW DIAGRAM



SEQUENCE

GLOBAL OUTDOOR SENSOR

The system shall use the UK global outdoor air sensor as the primary outdoor temperature reading. If the sensor fails, or communication is lost, the local outdoor air sensor shall be used as backup.

RUN CONDITIONS

The unit shall run whenever one of the below conditions is true and the unit is not shutdown on any safeties.

The schedule is "Occupied" and at least one zone occupancy sensor has been registered as "Occupied" for a minimum of 10 minutes (adj.)

The schedule is "Unoccupied" and the maximum zone humidity (ZMH) measures above the Unoccupied Humidity setpoint of 55% RH (adj.) for a minimum duration of 10 minutes (adj.).

The schedule is "Unoccupied" and the zone average temperature (ZAT) is above the Unoccupied Cooling Setpoint (UNOCCCLG_SPT).

Morning cool-down mode is enabled.

The zone average temperature and maximum zone humidity shall both use a primary-failsafe scheme. If the primary value (ZAT / ZMH) cannot be read across the network, the last known value shall continue to be used for 15 minutes (adj.). If the primary value cannot be read after 15 minutes (adj.) a failsafe value shall be used. When the primary value is restored, there will be a 15 minute (adj.) delay before the hot water system reverts back to using the primary value.

A network signal shall be provided that will allow the unit to bypass the schedule and be manually commanded on or off.

MORNING COOL-DOWN

Morning cool-down shall be enabled only when the unit has started early, prior to the time schedule as a result of optimized start feature. Morning cool-down mode shall be enabled when the zone average temperature is above the morning cool-down setpoint (MRNNCLG_SPT), 75°F (adj.). Morning cool-down mode shall be disabled when the zone average temperature rises above 72°F (adj.).

DISCHARGE AIR TEMPERATURE CONTROL

The outside air damper, mixed air damper, exhaust air damper, and cooling coil valve shall modulate, as part of the discharge temperature control strategy, to maintain the discharge air temperature at the discharge air temperature setpoint.

Provide a discharge air temperature reset. The discharge air temperature setpoint shall reset based on zone average temperature as follows:

ZAT = 75°F (adj). DAT = 55°F (adj.)

ZAT = 70°F (adj.) DAT = 65°F (adj.)

Provide a network input that will allow operators to manually enable /disable the discharge air temperature reset control. If the temperature reset is disabled, the unit will control using a fixed discharge air temperature setpoint.

ECONOMIZER AND OUTSIDE AIR DAMPER

When the unit is enabled, and the outside air temperature is less than the Economizer Setpoint (ECON_SP), 68°F the outside air damper shall utilize free cooling. The outside air damper shall modulate between the minimum outside air damper position (MINOAD_SPT) and 100% open to maintain the discharge air temperature at setpoint.

When the outside air temperature is above the Economizer Setpoint (ECON_SP), the outside air damper shall be indexed to the minimum outside air damper position.

The outside air dampers shall maintain a minimum position while the unit is enabled, unless the mixed air low limit control loop is active. If the mixed air low limit control loop is active, the outside air damper shall be allowed to close past the minimum outside air damper position. The minimum outside air damper position shall be determined during the commissioning period to meet the requirements of actual field conditions.

If the unit is in morning warm-up, or cycling during unoccupied periods, the outside air damper shall remain closed.

MIXED AIR DAMPER

The mixed air damper (MAD) shall inversely follow the outside air damper and modulate to maintain the discharge air temperature at the discharge air temperature setpoint (adj.).

Provide a mixed air low limit control loop. The mixed air low limit control loop will override the discharge air temperature control loop when the mixed air temperature is less than or equal to the mixed air low limit setpoint (MATLL_SPT), 47°F (adj.). The mixed air low limit control loop shall allow the outside air damper to close past the minimum outside air damper position.

SUPPLY FAN CONTROL

The variable speed supply fan(s) (SF) shall be enabled after the outside air damper status has proven open, unless the unit is shutdown on safeties. When the supply fan status (STS) indicates the fan has started, the control sequence shall be enabled.

The supply fan(s) shall modulate speed to maintain duct static pressure (DADP) at setpoint. Upon loss of airflow, the system will send an alarm to the BAS.

To prevent short cycling, the supply fan(s) shall have adjustable minimum run and off times. The minimum adjustable run and off times shall be adjusted during the commissioning period to meet the requirements of actual field conditions

Provide run indication for each fan in the fan wall assembly

Alarms shall be provided as follows:

FAN FAILURE: Fan commanded on, but the status is off.

FAN IN HAND: Fan commanded off, but the status is on.

RETURN FAN CONTROL

The variable speed return fan (RF) shall be started after the supply fan status has proven "On". The return fan will modulate in conjunction with the supply fan.

The return fan speed will modulate to maintain an offset between the discharge air flow (DAF) and return air flow (RAF). The offset percentage shall be adjusted during the commissioning period to meet the requirements of actual field conditions.

Provide run indication for each fan in the unit.

COOLING COILS

The cooling coil valves shall be enabled whenever:

The outside air temperature is greater than 55°F (adj.)

And the supply fan status is on.

The economizer is disabled, or the outside air damper is open 100% if the economizer is enabled.

The cooling coil valves shall modulate to maintain the discharge air temperature at the discharge air temperature setpoint. The bottom cooling coil valve shall be fully open before the top cooling coil valve begins to open.

DEHUMIDIFICATION

Dehumidification shall be enabled when the maximum zone humidity (ZMH) rises above the humidity setpoint of 55% RH (adj.). Dehumidification mode shall be disabled when ZMH falls below the setpoint, minus 8% RH differential (adj.).

When dehumidification is active, the cooling coil valve shall modulate to maintain the cooling coil discharge temperature (CCDT) at 55°F (adj.).

When dehumidification is enabled, an enable signal shall be sent to the chilled water systems.

If the unit is enabled for unoccupied dehumidification, all associated VAVs shall be indexed to "Occupied".

Provide a network input that will allow operators to manually enable and disable dehumidification mode.

UNIT PROTECTION

Freezestat Alarm (FRZ) - When the freezestat low temperature switch is activated, a freezestat alarm will be generated. When in alarm:

The fans will be disabled via a hard-wired shutdown circuit

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

High Static Shutdown (HSS) - The unit will be disabled if the high static pressure switch is activated.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Discharge Air Smoke Detector (SMKD) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Return Air Smoke Detector (SMKR) - The unit will be disabled if smoke is detected.

The fans will be disabled via a hard-wired shutdown circuit.

The outside air damper (OAD) and exhaust air damper (EAD) shall close.

Filter Change Required - A warning, signaling a filer change, will be generated when the differential pressure across the filter exceeds 1inWC (adj.)

Leak Detection (LEAK) – Provide a leak detection sensor (Basis of Design: Kele WD-2-T-10) for monitoring the unit coils. Upon leak detection, an alarm shall be issued to the BAS but the unit shall remain enabled. Provide alarms for the following:

Leak Detection

Failure of leak detection sensor integrity test

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AHU-1

JOB NO.	2302
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REVISIONS

No.	Description	Date
DD		FEB 7, 2024

SHEET

IC6.13

BILL OF MATERIALS

Qty	Device Tag	Description	Furnished By	Installed By	Wired and Terminated By
1	DADP	DIFF PRESSURE SENSOR	CONTRACTOR	CONTRACTOR	CONTRACTOR
1	PFLTR	DIFF PRESSURE SENSOR			
1	DAP	STATIC PRESSURE SENSOR			
1	OAT	TEMPERATURE TRANSMITTER			
1	MAT	TEMPERATURE TRANSMITTER			
1	DAT	TEMPERATURE TRANSMITTER			
1	RAT	TEMPERATURE TRANSMITTER			
1	CCST1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCST2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT1	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCRT2	TEMPERATURE TRANSMITTER WITH THERMOWELL AND ELEMENT			
1	CCDT	TEMPERATURE TRANSMITTER			
1	DAH	HUMIDITY SENSOR			
1	RAH	HUMIDITY SENSOR			
1	DAF	AIRFLOW SENSOR			
1	RAF	AIRFLOW SENSOR			
1	HSS	HIGH PRESSURE SWITCH			
1	OAD	OUTSIDE AIR DAMPER			
1	MAD	MIXED AIR DAMPER			
1	EAD	EXHAUST AIR DAMPER			
1	SF	SUPPLY FAN WITH VFD			
1	CLGV1	COOLING VALVE			
1	CLGV2	COOLING VALVE			
1	RF	RETURN AIR FAN WITH VFD			
1	LEAK	LEAK DETECTION SENSOR			
1	SMKD	SMOKE DETECTOR			
1	SMKR	SMOKE DETECTOR			
8	ISL	CURRENT SWITCH			

POINTS LIST

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU4_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU4_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU4_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU4_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU4_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU4_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU4_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU4_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU4_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU4_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU4_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU4_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU4_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU4_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU4_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU4_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU4_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU4_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU4_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU4_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU4_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU4_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU4_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_AHU4_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_AHU4_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

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AHU-4
BILL OF MATERIALS AND POINTS

JOB NO.	2302
DATE	5/22/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
DD		FEB 7, 2024

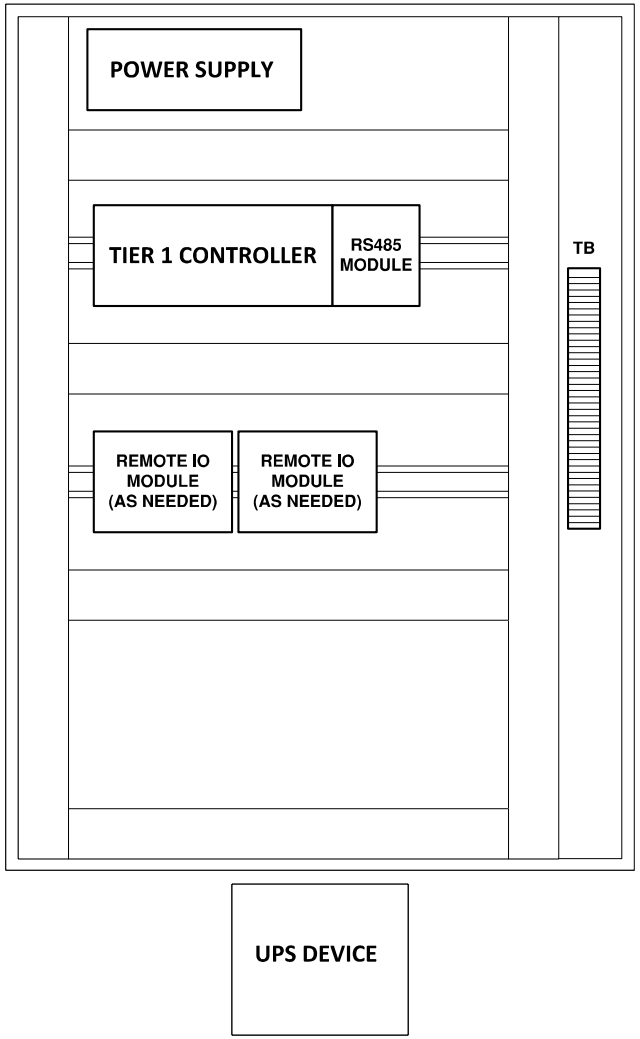
SHEET
IC6.14

CRB_0025_00_OB23_CHW

NOTES:
See System Architecture Riser for control panel requirements.

See Ground Floor Architecture for BACnet communication chain.

CONTROL PANEL LAYOUT



CHILLED WATER

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Schedule	Trend	Alarm	Graphic
VCHWST	CRB_00_OB23_HVA_CHW_VCHWST	Valved Chilled Water Supply Temperature	TEMP SENSOR	X								X		X
PCHWRT	CRB_00_OB23_HVA_CHW_PCHWRT	Plant Chilled Water Return Temperature	TEMP SENSOR	X								X		X
BCHWST	CRB_00_OB23_HVA_CHW_BCHWST	Building Chilled Water Supply Temperature	TEMP SENSOR	X								X		X
BCHWRT	CRB_00_OB23_HVA_CHW_BCHWRT	Building Chilled Water Return Temperature	TEMP SENSOR	X								X		X
BCHWT	CRB_00_OB23_HVA_CHW_BCHWT	Bypass Chilled Water Temperature	TEMP SENSOR	X								X		X
OAT	CRB_00_OB23_HVA_CHW_OAT	Local Outside Air Temperature	TEMP SENSOR	X								X		X
BCHWF	CRB_00_OB23_HVA_CHW_BCHWF	Building Chilled Water Supply Flow	FLOW SENSOR	X								X		X
PCHWSP	CRB_00_OB23_HVA_CHW_PCHWSP	Plant Chilled Water Supply Pressure	STATIC PRESS SENSOR	X								X		X
PCHWRP	CRB_00_OB23_HVA_CHW_PCHWRT	Plant Chilled Water Return Pressure	STATIC PRESS SENSOR	X								X		X
DCHWP	CRB_00_OB23_HVA_CHW_DCHWSP	Downstream Chilled Water Pressure	STATIC PRESS SENSOR	X								X		X
BCHWSP	CRB_00_OB23_HVA_CHW_BCHWSP	Building Chilled Water Supply Pressure	STATIC PRESS SENSOR	X								X		X
CHWDP	CRB_00_OB23_HVA_CHW_CHWDP	Chilled Water Differential Pressure	DIFF PRESS SENSOR	X								X		X
PCHWV	CRB_00_OB23_HVA_CHW_PCHWV	Plant Chilled Water Valve	DC VOLTAGE OUTPUT		X							X		X
BYPV	CRB_00_OB23_HVA_CHW_BYPV	Chilled Water Bypass Valve	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_OB23_HVA_CHWP1_SPD	Chilled Water Pump PU-1 VFD Speed	DC VOLTAGE OUTPUT		X							X		X
MEZVLV	CRB_00_OB23_HVA_CHW_MEZVLV	Building Chilled Water Supply Valve - To Mezzanine AHU	DC VOLTAGE OUTPUT											
CRBVLV	CRB_00_OB23_HVA_CHW_CRBVLV	Building Chilled Water Supply Valve - To White Hall	DC VOLTAGE OUTPUT											
STS	CRB_00_OB23_HVA_CHWP1_STS	Chilled Water Pump PU-1 Running Status	DRY CONTACT			X						X	X	X
ALM	CRB_00_OB23_HVA_CHWP1_ALM	Chilled Water Pump PU-1 VFD Fault	DRY CONTACT			X						X	X	X
LEAK	CRB_00_OB23_HVA_CHW_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_OB23_HVA_CHW_LEAKTRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
CMD	CRB_00_OB23_HVA_CHWP1_CMD	Chilled Water Pump PU-1 Enable	RELAY COIL				X					X		X
CHWMST	CRB_00_OB23_HVA_CHWM_CHWMST	Chilled Water Monitor Supply Temperature	INTEGRATED INTO CHW MONITOR					X				X		X
CHWMRT	CRB_00_OB23_HVA_CHWM_CHWMRT	Chilled Water Monitor Return Tempereature	INTEGRATED INTO CHW MONITOR					X				X		X
CHWMSF	CRB_00_OB23_HVA_CHWM_CHWMF	Chilled Water Monitor Flow	INTEGRATED INTO CHW MONITOR					X				X		X
SOAT	CRB_00_OB23_HVA_SOAT	Outside Air Temperature (shared through BAS)	NONE					X				X		X
N/A	CRB_00_OB23_HVA_BCWHRT_SPT	Building Chilled Water Return Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_BCHWST_MAXSPT	Building Chilled Water Maximum Supply Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_BCHWST_HIALM	Building Chilled Water Supply High Temperature Alarm & Setpoint	NONE					X				X	X	X
N/A	CRB_00_OB23_HVA_BCHWST_LOALM	Building Chilled Water Supply Low Temperature Alarm & Setpoint	NONE					X				X	X	X
N/A	CRB_00_OB23_HVA_VCHWST_SPT	Valved Chilled Water Supply Temperature Setpoint	NONE					X						X
N/A	CRB_00_OB23_HVA_CHWM_BTU	Chilled Water Monitor Energy Total	NONE					X				X		X
N/A	CRB_00_OB23_HVA_CHWM_TOTFLOW	Chilled Water Monitor Totalized Flow	NONE					X				X		X
N/A	CRB_00_OB23_HVA_PU1_ALM	Pump PU-1 Failure	NONE						X			X	X	X
N/A	CRB_00_OB23_HVA_PU1_HAND	Pump PU-1 In Hand	NONE						X			X	X	X
N/A	CRB_00_OB23_HVA_PU1_RTALM	Pump PU-1 Runtime Exceeded	NONE						X			X	X	X

CHILLED WATER

See IC6.04 for Chilled Water sequence and flow diagram.

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CRB_0025_00_OB23_CHW
CONTROL PANEL DETAILS

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

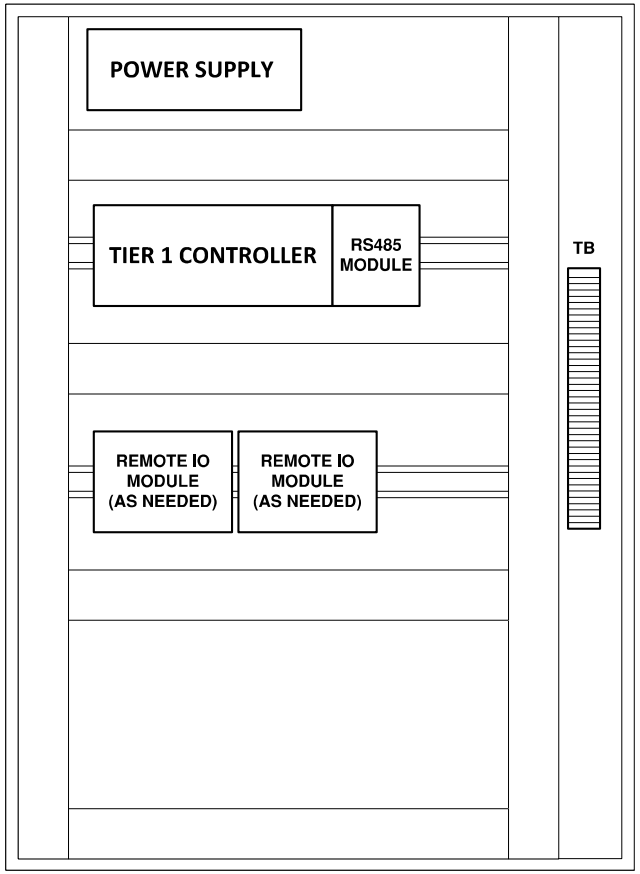
IC7.01

CRB_0025_00_0053_AHU1

NOTES:
See System Architecture Riser for control panel requirements.

See Ground Floor Architecture for BACnet communication chain.

CONTROL PANEL LAYOUT



UPS DEVICE

AHU-1

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU1_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU1_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU1_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU1_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU1_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU1_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU1_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU1_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU1_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU1_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU1_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU1_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU1_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU1_DAF	Discharge Air Flow	AIRFLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU1_RAF	Return Air Flow	AIRFLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU1_OAF	Outside Air Flow	AIRFLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU1_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU1_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU1_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU1_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU1_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU1_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU1_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximuim Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_MAU1_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_MAU1_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

AHU-1

See IC6.07 for AHU-1 sequence and flow diagram.

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CRB_0025_00_0053_AHU1
CONTROL PANEL DETAILS

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

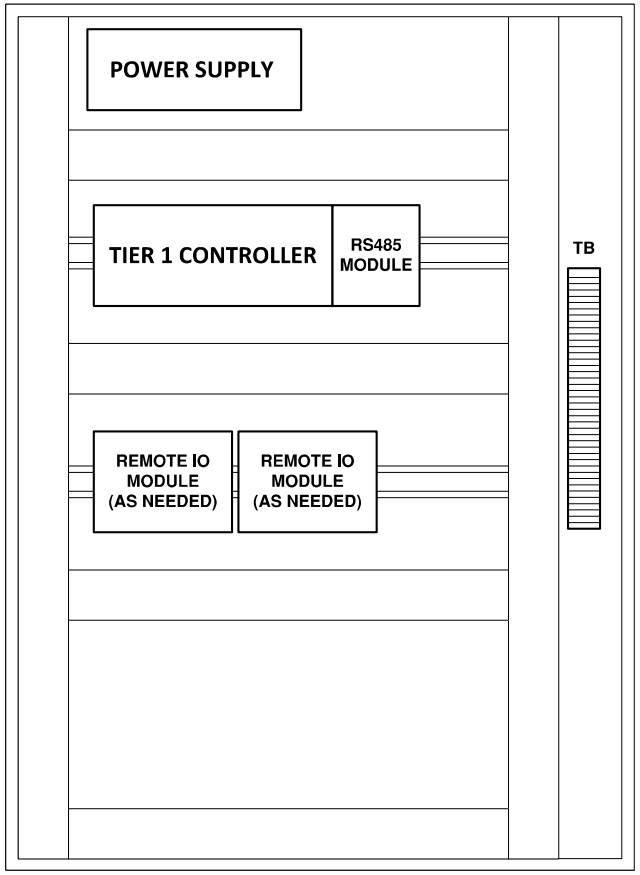
IC7.02

CRB_0025_00_0053_AHU2

NOTES:
See System Architecture Riser for control panel requirements.

See Ground Floor Architecture for BACnet communication chain.

CONTROL PANEL LAYOUT



AHU-2

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU2_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU2_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU2_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU2_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU2_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU2_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU2_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU2_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU2_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU2_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU2_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU2_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU2_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU2_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU2_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU2_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU2_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU2_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU2_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU2_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU2_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU2_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU2_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_MAU1_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_MAU1_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

AHU-2

See IC6.09 for AHU-2 sequence and flow diagram.

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CRB_0025_00_0053_AHU2
CONTROL PANEL DETAILS

JOB NO.	2302
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DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

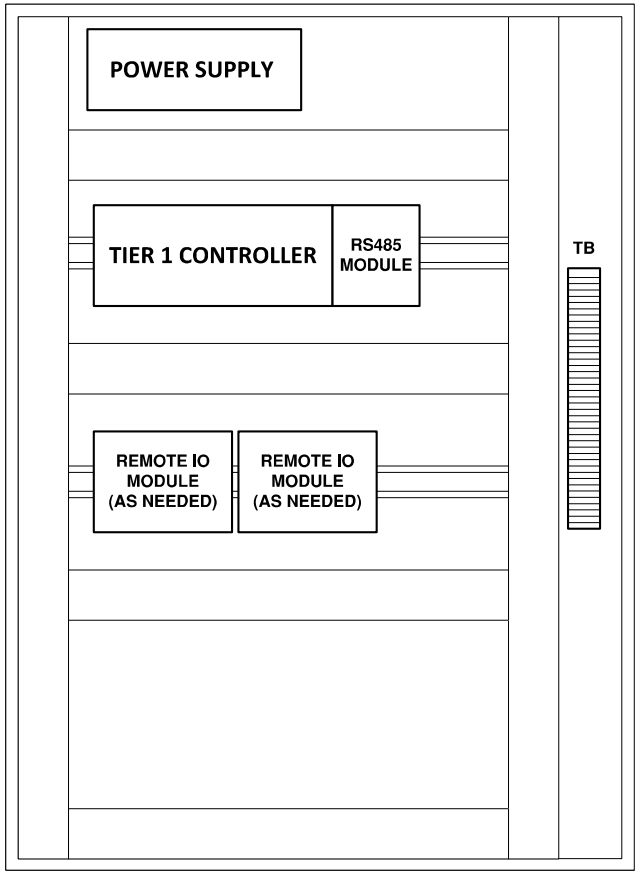
IC7.03

CRB_0025_00_0053_AHU3

NOTES:
See System Architecture Riser for control panel requirements.

See Ground Floor Architecture for BACnet communication chain.

CONTROL PANEL LAYOUT



AHU-3

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU3_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU3_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU3_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU3_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU3_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU3_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU3_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU3_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU3_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU3_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU3_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU3_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU3_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU3_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU3_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU3_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU3_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU3_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU3_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU3_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU3_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU3_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU3_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_AHU3_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_AHU3_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

AHU-3

See IC6.11 for AHU-3 sequence and flow diagram.

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CRB_0025_00_0053_AHU3
CONTROL PANEL DETAILS

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

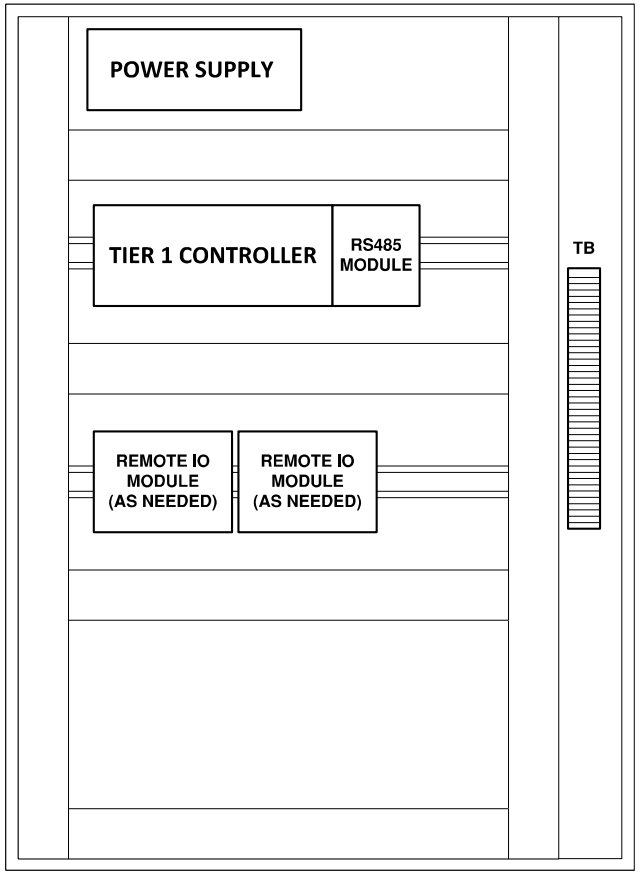
IC7.04

CRB_0025_00_0053_AHU4

NOTES:
See System Architecture Riser for control panel requirements.

See Ground Floor Architecture for BACnet communication chain.

CONTROL PANEL LAYOUT



AHU-4

				HARDWARE POINTS				SOFTWARE POINTS						Show on
Tag	Full Point Name	Point Description	Wiring Type	AI	AO	DI	DO	AV	BV	Loop	Sched	Trend	Alarm	Graphic
OAT	CRB_00_0053_HVA_AHU4_OAT	Outside Air Temperature	TEMP SENSOR	X								X		X
DAT	CRB_00_0053_HVA_AHU4_DAT	Discharge Air Temperature	TEMP SENSOR	X								X		X
MAT	CRB_00_0053_HVA_AHU4_MAT	Mixed Air Temperature	TEMP SENSOR	X								X		X
RAT	CRB_00_0053_HVA_AHU4_RAT	Return Air Temperature	TEMP SENSOR	X								X		X
CCST1	CRB_00_0053_HVA_AHU4_CCST1	Cooling Coil 1 Supply Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU4_CCST2	Cooling Coil 2 Supply Temperature	TEMP SENSOR	X								X		X
CCRT1	CRB_00_0053_HVA_AHU4_CCRT1	Cooling Coil 1 Return Temperature	TEMP SENSOR	X								X		X
CCST2	CRB_00_0053_HVA_AHU4_CCRT2_	Cooling Coil 2 Return Temperature	TEMP SENSOR	X								X		X
CCDT	CRB_00_0053_HVA_AHU4_CCDT	Cooling Coil Discharge Temperature	TEMP SENSOR	X								X		X
RAH	CRB_00_0053_HVA_AHU4_RAH	Return Air Humidity	HUMIDITY SENSOR	X								X		X
PFLTR	CRB_00_0053_HVA_AHU4_MADP	Filter Differential Pressure	DIFF PRESSURE SENSOR	X								X		X
DADP	CRB_00_0053_HVA_AHU4_DADP	Duct Static Pressure	DIFF PRESSURE SENSOR	X								X		X
DAP	CRB_00_0053_HVA_AHU4_DAP	Discharge Air Static Pressure	STATIC PRESSURE SENSOR	X								X		X
DAF	CRB_00_0053_HVA_AHU4_DAF	Discharge Air Flow	AIR FLOW SENSOR	X								X		X
RAF	CRB_00_0053_HVA_AHU4_RAF	Return Air Flow	AIR FLOW SENSOR	X								X		X
OAF	CRB_00_0053_HVA_AHU4_OAF	Outside Air Flow	AIR FLOW SENSOR	X								X		X
CLGV1	CRB_00_0053_HVA_AHU4_CLGV1	Cooling Valve 1 Output	DC VOLTAGE OUTPUT		X							X		X
CLGV2	CRB_00_0053_HVA_AHU4_CLGV2	Cooling Valve 2 Output	DC VOLTAGE OUTPUT		X							X		X
SPD	CRB_00_0053_HVA_SF_SPD	Supply Air Fan Speed	DC VOLTAGE OUTPUT		x							X		X
SPD	CRB_00_0053_HVA_RF_SPD	Return Air Fan Speed	DC VOLTAGE OUTPUT		X							X		X
OAD	CRB_00_0053_HVA_OAD_STS	Outside Air Damper Output	DC VOLTAGE OUTPUT		X									X
MAD	CRB_00_0053_HVA_MAD_STS	Mixed Air Damper Output	DC VOLTAGE OUTPUT		X									X
EAD	CRB_00_0053_HVA_EAD_STS	Exhaust Air Damper Output	DC VOLTAGE OUTPUT		X									X
HSS	CRB_00_0053_HVA_AHU4_HSS	High Static Safety Shutoff	HIGH PRESSURE SWITCH			X						X	X	X
STS	CRB_00_0053_HVA_SF_STS	Supply Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_SF_ALM	Supply Air Fan Alarm	DRY CONTACT			X							X	X
STS	CRB_00_0053_HVA_RF_STS	Return Air Fan Status	DRY CONTACT			X								X
ALM	CRB_00_0053_HVA_RF_ALM	Return Air Fan Alarm	DRY CONTACT			X							X	X
LEAK	CRB_00_0053_HVA_AHU4_LEAK	Leak Detection	DRY CONTACT			X						X	X	X
TRB	CRB_00_0053_HVA_AHU4_TRB	Leak Detection Trouble Alarm	DRY CONTACT			X						X	X	X
SMKD	CRB_00_0053_HVA_AHU4_SMKD	Discharge Air Smoke Detector Status	DRY CONTACT			X						X	X	X
SMKR	CRB_00_0053_HVA_AHU4_SMKR	Return Air Smoke Detector Status	DRY CONTACT			X						X	X	X
CMD	CRB_00_0053_HVA_SF_CMD	Supply Air Fan Enable	RELAY COIL				X							X
CMD	CRB_00_0053_HVA_RF_CMD	Return Air Fan Enable	RELAY COIL				X							X
SOAT	CRB_00_0053_HVA_SOAT	Outside Air Temp (Shared through BAS)	NONE					X						X
N/A	CRB_00_0053_AHU1_OCCCLG_SPT	Occupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_OCCHTG_SPT	Occupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCCLG_SPT	Unoccupied Cooling Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_UNOCCHTG_SPT	Unoccupied Heating Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZAT	Zone Average Temperature	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ZMH	Maximum Zone Humidity	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DAT_SPT	Discharge Air Temperature Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MRNWRM_SPT	Morning Warm-Up Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MATLL_SPT	Mixed Air Temperature Low Limit Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_MINOAD_SPT	Minimum Outside Air Damper Position Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_SPT	Economizer Enable Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_ECON_CMD	Economizer Enable	NONE						X			X		X
N/A	CRB_00_0053_AHU1_DEHUM_SPT	Dehumidification Setpoint	NONE					X				X		X
N/A	CRB_00_0053_AHU1_DEHUM_CMD	Dehumidification Enable	NONE						X			X		X
N/A	CRB_00_0053_HVA_AHU4_HDAT	High Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_HVA_AHU4_LDAT	Low Discharge Air Temperature Alarm	NONE						X			X	X	X
N/A	CRB_00_0053_AHU1_FLTR_SPT	Filter Change Differential Pressure Setpoint	NONE					X						X
N/A	CRB_00_0053_AHU1_FLTR_WRN	Filter Change Required	NONE						X			X	X	X

AHU-4

See IC6.13 for AHU-4 sequence and flow diagram.

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CRB_0025_00_0053_AHU4
CONTROL PANEL DETAILS

JOB NO.	2302
DATE	5/23/2024
DRAWN	TCC
CHECKED	RTM

REVISIONS

No.	Description	Date
00		FEB 7, 2024

SHEET

IC7.05

SECTION 237323 – CUSTOM AIR-HANDLING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The air handlers, shipping to site and factory startup will be purchased through RFP and furnished to the contractor for installation.

B. All of the air-handling units and return fan units will be owner furnished and contractor installed. This specification is a reference for the installing contractor.

1.3 SCOPE

A. The specifications describe the work to be done and the materials to be provided for furnishing custom air-handling units.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for the custom air-handling unit specified, which includes the following:

1. Brief description of each unit section layout including type of floor, walls, insulation, base frame, access doors, windows in access door, door latches, lights, electrical devices, pressure gauges, thermometers and drain pans.

2. For all fans:

a. Fan manufacturer, arrangement, rotation, class and optional accessories (inlet screen, protection cages and etc.)

b. Certified fan-performance curves with system operating conditions indicated.

c. Certified fan-sound power ratings.

3. Sound absorption criteria and sound transmission loss data for Octave Bands 1 through 7 for wall and roof panels with perforated interior skins.

4. Lights/GFI/Switches with construction and electrical characteristics.

5. Certified coil-performance ratings with system operating conditions indicated.

6. Motor ratings and electrical characteristics plus motor and fan accessories.

7. Material gages and finishes.

8. Filter Frame construction including size and shape of holding clips or clamps.

9. Dampers, including housings, linkages. Indicate on the shop drawings the future location of the actuators (actuators are to be provided by others.)

10. Access Doors to be used.

11. Flexible Connections for the fans: type and manufacturer's specification sheet

12. Vibration isolators: construction, load ranges, layout with dimensions.

13. Magnehelic Gages: Type and manufacturer specification sheet.

14. Thermometers: Type and manufacturer's specification sheet.

15. Floor Drains: Type and accessories.

C. Shop Drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. The shop drawings shall clearly show the location of each wall face and type of face, being perforated or solid. The routing of the motor conduits from the motor pecker head to the junction box shall be shown on the shop drawing. If the unit cannot be shipped in a single package, indicate on a drawing how the unit will be broken down for shipping and how the unit will be reassembled on the jobsite. Show the location of each floor drain and routing of the drain piping.

D. ALL UNIT SHOP DRAWINGS ARE TO BE DRAWN TO A MINIMUM SCALE OF 1/4" = 1'-0".

E. Shop drawing details: Include in the submittal, the following details:

1. Wall construction, both perforated and solid wall faces.

2. Floor and roof construction

3. Piping arrangement for each component

4. Trolley beam and coil pull ring assemblies

5. For each fan type - fan, inertia base, seismic restraints, and support structure for each coil type – coil support assembly, method of attachment of the moisture eliminator to the coil, drain pan (indicating direction of slope), size of condensate drainage piping

6. Shipping split assembly

F. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.

G. Welding Certificates: Provide certification of individuals who will be welding the piping in accordance to ASME Code, Section IX as required by the Commonwealth of Kentucky,

Department of Housing, Building and Construction, Office of State Fire marshal Boiler Inspection Section (Boiler and Pressure Vessel and Pressure Piping Law).

H. Include maintenance data for custom air-handling unit in the operation and maintenance manual.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Custom air-handling unit and components shall be designed, fabricated, and installed in compliance with NFPA 90A, “Installation of Air Conditioning and Ventilating Systems.”

B. Comply with current issue of the Kentucky Building Code.

C. Comply with NFPA 70 for components and installation.

D. All materials and devices used in the construction and operation of the custom air handling unit shall not exceed a flame spread index of 25 and a smoke developed index of 50.

E. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

F. The Terms “Listed” and “Labeled”: As defined in the National Electrical Code, Article 100.

G. UL and NEMA Compliance: Provide motors required as part of air-handling unit that are listed and labeled by UL and comply with applicable NEMA standards.

H. ETL Certification:

1. Provide an additional breakout price for ETL Certification.

I. Compliance with Kentucky Boiler and Pressure Vessel and Pressure Piping Law: All welds on the hot water and steam systems are to be done by a certified welder fulfilling the requirement of ASME Code, Section IX (KY Boiler Code: New Installations – 815 KAR 15:025, Section 1. Minimum Standards) and is to be inspected by the Commonwealth of Kentucky Department of Housing, Buildings and Construction for compliance.

J. Listing and Labeling Agency Qualifications:

1. A “Nationally Recognized Testing Laboratory” (NRTL) as defined in OSHA. Regulation 1910.7.

K. Coordination: Coordinate layout and installation of central-station air-handling units with piping and ductwork and with other installations.

L. Warranty

1. The air handling unit manufacturer shall provide the parts warranty for equipment manufactured by them and all vendor supplied components. Said warranty shall cover replacement of all defective parts for a 12 month period after the architect issues a substantial completion declaration of the portion of the project the air handling unit serves.
2. Prior to the warranty period, the manufacturer’s representative is to be responsible for monthly inspection and maintenance while the unit is in this transition time period. The monthly inspection is to include but not limited to the following

a. Check to insure protective coil connection caps are in place,

b. Verify the unit is stored in a manner that is acceptable to the custom air handling unit manufacturer,

c. Perform a long term fan storage procedure as recommended by the fan manufacturer (similar to Twin City Engineering Supplement ES-201). Some of the procedures include but not limited to - rotation of the fan wheel and the greasing of the bearings with the fan impeller being left at approximately 180 degrees from that of the previous month to prevent the shaft and impeller from taking a set in one position.

d. Verify unit is clean. Cleaning is the responsible of the construction manager.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prior to shipment, all coils shall be degreased to remove oil and all coil fins shall be combed straight. Connections to coils shall have threaded protectors (caps or plugs) furnished on the coil connections. All items shipped loose such as filters, steam humidifier assemblies, caulking, etc. shall be itemized on the shipping ticket and be suitably secured in the unit or on a separate pallet. All duct connections shall be covered with plywood or sheet metal caps. All equipment shall be delivered to the job site suitably packaged and protected for overland trucking and for storing the equipment outside exposed to the weather.

B. Work out a shipping schedule of priority with the Construction Manager, which shall determine the manufacturing and delivery sequence.

C. Building constraints, unit size and trucking limitations will require that units be shipped in more than one piece. Limit the maximum weight of any piece to 20,000# unless directed otherwise by the Construction Manager. Coordinate maximum size restraints with the Construction Manager. Indicate all split points on the shop drawings.

D. All vibration isolated components shall be suitably restrained before shipment.

E. The manufacturer is responsible for providing lift and support points on each units for rigging and positioning of the unit to its final destination. Clearly indicate the maximum load that can be imposed on any lift or support point.

F. Lift and support units with manufacturer’s designated lifting or supporting points.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate size and location of concrete housekeeping bases.

B. Coordinate size and location of structural-steel support members.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed. These extra materials are to be packaged with protective covering for storage, and are identified with labels describing contents.

1. Filters: Furnish 1 set for each panel filter bank of the custom air-handling unit. These are to be installed after substantial completion. Contractor is responsible for any additional filters.
2.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Daikin
2. Air Flow Equipment Company
3. ClimateCraft
4. Governaire
5. TMI Custom Solutions
6. Webco, Inc.

2.2 GENERAL:

A. Air handling units shall be of the type and arrangement as shown on the drawings and as described in the specifications. The unit manufacturer shall accept total responsibility for the construction and performance of the complete air handling unit including all components. Unit performance shall be as shown on the equipment schedules.

B. The general design of each unit shall consist of heavy duty mill galvanized unit casing mounted on an all welded structural steel channel and I-beam base. All parts of the air handling unit shall be manufactured of galvanized steel, except where otherwise noted differently in the specification or drawings. All interior and exterior parts of the fan, channel base, and other bracing, shall be coated with a lead and chromate-free oxide alkyd primer.

2.3 UNIT CONSTRUCTION:

A. Fabricate unit with heavy gauge channel posts and panels secured with mechanical fasteners. All panels, access doors, and ship sections shall be sealed with permanently applied bulb-type gasket. Shipped loose gasketing is not allowed.

B. Panels and access doors shall be constructed as a 2-inch nominal thick; thermal broke double wall assembly, injected with foam insulation with an R-value of not less than R-13.

1. The inner liner shall be constructed of G90 galvanized steel.

2. The outer panel shall be constructed of G90 galvanized steel.

3. The floor plate shall be furnished with 0.044 inch thick aluminum tread plate in sections as indicated on project schedule.

4. Unit will be furnished with solid inner liners.

C. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, maximum 5 inches of positive or 6 inches of negative static pressure. Deflection shall be measured at the panel midpoint.

D. The casing leakage rate shall not exceed 0.50 cfm per square foot of casing surface area at design static pressure up to a maximum of +5" w.c. in positive pressure sections and -6" w.c. in negative pressure sections (.0025 m3/s per square meter of cabinet area at 1.24 kPa static pressure)

E. Module to module field assembly shall be accomplished with an overlapping, full perimeter internal splice joint that is sealed with bulb type gasketing on both mating modules to minimize on-site labor and meet indoor air quality standards.

F. Access doors shall be flush mounted to cabinetry, with minimum of two six inch long stainless steel piano-type hinges, latch and full size handle assembly. Access doors shall swing outward for unit sections under negative pressure. Access doors on positive pressure sections, shall have a secondary latch to relieve pressure and prevent injury upon access.

G. A formed G60 galvanized steel base rail shall be provided by the unit manufacturer for structural rigidity and condensate trapping per drawing details. The base rail shall be constructed with 12-gauge nominal for unit sizes 003 - 035 and 10-gauge nominal for unit sizes 040 - 090. The following calculation shall determine the required height of the baserail to allow for adequate drainage. Use the largest pressure to determine base rail height. [(Negative)(Positive) static pressure (in)] (2) + 4" = required baserail height. Should the unit baserail not be factory supplied at this height, the contractor is required to supply a concrete housekeeping pad to make up the difference.

H. A round window inspection port shall be provided on unit section(s) as indicated on unit schedule and drawings.

I. Construct drain pans from stainless steel with cross break and double sloping pitch to drain connection. Provide drain pans under cooling coil section. Drain connection centerline shall be a minimum of 3'' above the base rail to aid in proper condensate trapping. Drain connections that protrude from the base rail are not acceptable. There must be a full 2'' thickness of insulation under drain pan.

J. An 0.044" thick aluminium treadplate shall be secured to the floor panel.

2.4 DAMPERS:

A. Damper operators will be provided by the control systems contractor and are not a part of the custom air handling unit.

B. Provide automatic control dampers as indicated, with damper frames not less than 13 gage galvanized steel. Provide mounting holes for enclosed duct mounting. Provide airfoil shaped

damper blades not less than formed 14 gage, with maximum blade width of 6". Provide industrial type dampers capable of withstanding 12” W.G. static pressure.

C. Secure blades to zinc-plated axles using zinc-plated hardware. Seal off against spring stainless steel blade bearings.

D. Provide blade bearings of nylon and provide thrust bearings at each end of every blade. Construct blade linkage hardware of zinc-plated steel and, brass. Submit leakage and flow characteristics plus size schedule for each damper.

E. Damper shaft sizes are to be in accordance to the static pressures to which they are operating against. Minimum shaft size is 3/4" in diameter. The maximum velocity through the damper is to be no more than 66% of the maximum velocity rating of the damper.

F. Provide opposed blade dampers.

G. Do not exceed a maximum 60”x60” damper size. For sizes larger than the maximum in either dimension, use multiple dampers with a separate operator for each damper. Do not link separate dampers together. Jack shafting the dampers is not acceptable.

H. Operating Temperature Range: From -20 degrees to 200 degrees F. (-29 degrees to 93 degrees C.)

I. Provide dampers with inflatable steel blade edging, or replaceable rubber seals, rated for leakage less than 10 CFM/sq.ft. of damper area, at differential pressure of 12” w.g.

J. Fan Isolation Dampers: Fan isolation dampers that are installed on the discharge of the fan shall have the blades mounted in the vertical position. Fan isolation dampers that are installed on the intake side of the fan shall have blades mounted in the horizontal position.

K. Gravity operated shutters at fan inlets or discharges shall meet damper specifications and have counterbalanced mechanisms to close them when their respective fans shut down.

2.5 AIR BLENDERS:

A. Air blenders shall be constructed of 0.08 gauge aluminum all welded construction. Blender shall consist of blade deflectors to prevent stratification and to provide equal air distribution through coils.

B. The blender shall be capable of providing a minimum mixing effectiveness of 80% when mixing 50% of 0 deg.F. cold air with 50% of 75 deg.F. warm air. The associated maximum temperature standard deviation through a plane parallel with the blender at the discharge of the mixing box shall be 6 deg.F. with 60 deg.F. difference between entering air streams.

C. The unit shall have provisions for floor or ceiling mounting.

D. Where multiple blenders are provided, they shall be arranged to eliminate stratification.

2.6 COILS - WATER:

A. Each coil shall be independently supported by a stainless steel rack for cooling coil to allow for individual coil removal. Individual coil removal shall not require the dismantling of upstream or

downstream components. Coil casings shall not be utilized as structural support for stacked coils. Each rack shall extend 6” past the header coil connections and 6” past the U-bends/coil casing.

B. Coils shall be removable through the unit casing through access doors and removable access panels. Removable access panels shall be large enough to allow a minimum of 3 inches of clearance on either size of the coil.

C. Coils shall be rated in accordance with ARI 410-81 and shall meet the specified performance.

D. Coils shall be 5/8” OD, 0.035” copper tube with 0.0095” aluminum plate fin, coil fins shall be the continuous plate type.

E. Coil headers shall be 0.049” thick copper pipe with brazed joints.

F. Coils that do not condense water vapor shall have 12 gauge-galvanized steel casings. Coils that do condense water vapor shall have 12 gauge-stainless steel casings (example: cooling coil).

G. Coils over 72” but under 96" in length shall have a support at the midpoint position along the length of the coil. Coils over 96” in length shall have two tube supports located at 1/3 & 2/3 positions along the length of the coil. The tube supports shall be hot-dipped galvanized steel for coils that do not condense water vapor and stainless steel for coils that do condense water vapor.

H. Provide each coil with (not shipped loose), a manual air vent on top of each header and a drain at the bottom of each header. Provide both the air vent and drain with a 1/2” ball valve. Install the air vent and drain valve as shown on the drawing details. Install both the drain valve and air vent so that the handle of valve can swing from the full open to the full closed position.

I. Extend pipe connections, except for the manual air vents and coil header drains through the unit casing to the exterior of the unit. Seal airtight all pipe penetrations through the unit casing. Pipe penetrations at the jobsite are not allowed.

J. Provide unions (for pipe sizes less than or equal to 2”) or Flanges (for pipe sizes 2-1/2” or larger) inside the unit at the coil headers for future coil removal.

K. The supply and return connections shall be on the same end of the coil.

L. Coil connections shall be flanged for sizes larger than 2” and threaded for sizes less than 2”.

M. Provide threaded or flanged plastic protectors (caps) on connections outside of the air handling unit before shipment.

N. Coils shall be designed for a working pressure of 200 psi and be factory tested at 250 psi of air under water.

O. Fasten cooling coils and drain pans to air handling unit sections all around perimeter of air handling unit sections. Seal off airtight so that all air passes through the cooling coils. Use panel wall construction to seal off cooling coils. Single wall metal safing is not acceptable.

P. Seal space between cooling coils and drain pans so that no air bypasses under cooling coils.

Q. All cooling coil, heat recovery coil, and humidifier sections shall include a double sloped drain pan constructed from 304L stainless steel. All corners shall be welded watertight. Coils shall rest on stainless steel supports. The pan shall have a minimum pitch of 2" from high point to the bottom of the drain outlet connection, providing at least a 1/8” per foot slope. The drain pan shall be

insulated with a 2-part sprayed on polyurethane, water impervious foam. Insulation shall be applied to the entire under side of the drain pan and coil section base assembly. If multiple stacked coils are used, intermediate drain pans are required. Intermediate pans shall be insulated and drained with 3/4" copper down-comers to the main pan. Floor drain pans shall be covered with a removable aluminum grating that can we stood on for maintenance.

2.7 COOLING COIL DRAIN PANS

A. Primary drain pans: Provide a 1-1/2" minimum depth, sloped full-length drain pan under each cooling coil section. Each coil shall have one and only one drain pan. Multiple drain pans per coil are not acceptable. Drain pans shall be 16 gauge fully welded 304 stainless steel insulated pans.

1. Mount primary pans above the floor, with the drain connection at 18" minimum above the bottom of the unit. Pans shall not be a part of the floor system.

2. Pans shall extend 4" upstream of the coil assembly to 12" minimum downstream of the assembly. The primary pan shall extend a minimum of 6" past the coil headers and 6" past the coil U-bends and coil casing.

3. The entire pan shall be positively double-sloped towards the condensate outlet at a minimum of ¼" per 1'-0".

4. The condensate drain shall be a 1-1/2" MPT 304 stainless steel. Locate the outlet on the bottom and at the lowest elevation of the pan.

B. Secondary drain pans: Provide 1" minimum depth intermediate drains pans where cooling coils are stacked. Drain pans shall be 16 gauge fully welded 304 stainless steel insulated pans. Pans shall extend 4" upstream to 12" downstream of the coil assembly. Pans shall extend 6" beyond the coil header connections and 6" beyond the U-bends and coil casing.

1. The drain pans shall be positively sloped towards the low points with a minimum slope of *¼"* per foot.

2. Down-comers: Provide pans with 1-1/4" down-comers of either Type 304 stainless steel or type M copper, draining to the lowest drain pan. The down-comer connections to the pan shall be free of burrs and mounted flush with the pan. There shall be a minimum of two down-comers per secondary drain pan, one on each end of the maximum length dimension of the drain pan.

C. Provide a plastic protection channel over the top of the insulation and the top lip of each drain pan.

2.8 CENTRIFUGAL FANS

A. FAN ASSEMBLIES – GENERAL

1. The fan shall be of the size and type specified in the unit schedule. To assure maximum performance, fans shall be supplied by a manufacturer specializing in fan design and production.

2. All fan assemblies shall be designed for heavy-duty industrial applications. Fan framing assemblies shall be fabricated from structural steel electrically welded to form a rigid, integral base. Individual fan assemblies shall be independently isolated.

3. All motors shall be NEMA design B with Class F insulation. Electrical characteristics and horsepower shall be as specified on the project schedule. All motors shall have a minimum service factor of 1.15. Motors shall have ball bearings. Motors shall be premium efficiency ODP type and shall be factory wired to a fan array motor overload panel. The motor shall be located within the unit and mounted on an adjustable heavy steel base. The motor base shall be fastened securely to the structural steel framing of the fan assembly.

4. All fans shall meet the minimum efficiency and maximum brake horsepower values as scheduled. All fans shall be selected to operate at a point no higher than 90% of the peak static pressure rating as defined by the fan performance curve at the selected operating speed. Manufacturer must ensure maximum fan RPM is below the first critical speed.

5. Each fan shall be provided with a factory installed airflow measuring device. Airflow device to be mounted out of the direct air stream so as not to affect system static pressure or sound performance. Sensor accuracy shall be +/- 3%. Factory installed assembly shall include flow sensors for field connection to a transducer provided by others.

B. FAN ASSEMBLIES – DIRECT DRIVE FAN ARRAY

1. Fan Arrays shall be direct-drive, non-overloading SWSI plenum fans designed for industrial duty and suitable for continuous operation.

   a. Fans shall be arranged in an array using one or more welded structural steel assemblies and shall be of the size and quantity specified in the unit schedule. Screwed or riveted frames are unacceptable. Fan assemblies shall be attached directly to base structural members.

   b. Fan wheels shall have a minimum of 12 airfoil blades for superior sound characteristics and shall be constructed of aluminum to reduce rotational weight and vibration. Fan blades shall be extruded aluminum for uniformity and improved vibration characteristics. Fan wheels that have less than 12 airfoil blades are not acceptable.

   c. Each fan and motor assembly shall be independently isolated within the structural assembly using 1-inch deflection spring isolators. Isolators shall be mounted in a three-point arrangement that provides both vertical and horizontal (thrust) isolation and shall not require field adjustment. If hard mounted or rubber in shear is used in place of internal spring isolations, external isolation of the entire air handling unit is required, no exceptions.

   d. A fan inertia base shall be provided or the fan structure shall exceed an equivalence of 2x mass of the total rotating parts of the fan array. Fan and motor assemblies shall be designed such that no natural frequencies exist within the operating RPM range of the fan, eliminating the need for “lockout” frequency settings in the variable speed drive. The installing contractor will be responsible for all costs associated with externally isolating any unit that does not include individual fan isolation.

   e. All fan arrays shall meet the minimum motor efficiency, maximum brake horsepower and total motor horsepower values scheduled. All fans shall be selected to operate

at a point no higher than 90% of the peak static pressure rating as defined by the fan performance curve at the selected operating speed. Manufacturer must ensure maximum fan RPM is below the first critical speed. Fans shall be Class 2 or Class 3 construction as required for the application.

f. All fan and motor assemblies shall be dynamically balanced by the manufacturer to a maximum allowable vibration of 0.040 inches per second at design RPM and a maximum 0.080 inches per second overall vibration limit to bring the fan balance in conformance to a BV-5 Grade G1 per ANSI/AMCA 204. In addition, the manufacturer shall insure that no critical frequencies exist in the fan operating range by varying motor speed in 1Hz increments from design RPM to 50% of design RPM.

2. Supply Fan Array Unloading

a. Supply fan arrays shall be provided with unloading capability to allow fan modulation without surge from 100% to 40% of design airflow. There shall be no static pressure or intake plenum losses or any horsepower penalty associated with the system.

b. They system shall provide a positive shutoff for each fan in case of a fan failure. Each fan shall be provided with an isolation or backdraft damper to prevent bypass in the event of a motor failure. Blank off plates requiring manual installation are not acceptable.

c. Fan curves shall be submitted; with the system curve indicating the minimum system operating static pressure and the point of fan surge.

C. Wheels

1. Airfoil-Fan Wheels: Steel or aluminum construction with smooth-curved inlet flange; heavy back plate; hollow die-formed, airfoil-shaped blades continuously welded at tip flange and back plate; cast-iron or cast-steel hub riveted to back plate and fastened to shaft with set screws.

D. Shafts

1. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.

2. Turned, ground, and polished hot-rolled steel with keyway. Ship with a protective coating of lubricating oil.

3. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

E. Bearings

1. Grease-Lubricated Shaft Bearings: Self-aligning, pillow-block-type, ball or roller bearings with adapter mount and two-piece, cast-iron housing.

a. Ball-Bearing Rating Life: ABMA 9, L_{10} of 120,000 hours.

b. Roller-Bearing Rating Life: ABMA 11, L_{10} of 120,000 hours.

F. Fan Array Controls

1. Fan arrays shall be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

2. Each fan array in the air handling unit shall be provided with an airflow measuring system. Using one air flow measuring device and multiplying by the number of fans provided is not acceptable due to lack of accuracy.

3. The central processor shall be able to detect and report a fan failure. Auxiliary contacts on the motors starters are not acceptable as fans can fail without tripping overloads. Current sensors wired into the central processors can be utilized.

4. A BACnet communication interface shall be provided to allow the BAS contractor to view the following. The BACnet interface shall be capable of the following protocols: BACnet MS/TP. The following BACnet points shall be available for viewing at the BAS system:

   a. Supply fan array total airflow, pressure rise, average temperature, density, average speed.

   b. Return fan array total airflow, pressure rise, average temperature, density, average speed.

   c. Relay 1 status – power

   d. Relay 2 status – fan failure

   e. Relay 3 status – warning

G. FAN SPEED CONTROL

1. Each variable air volume supply and return fan array shall be provided with an individual variable frequency drive as specified under another specification section.

H. Accessories

1. Companion Flanges: Galvanized steel, for duct connections.

2. Inlet Screens: Galvanized steel welded grid screen.

3. Protective Cage (for Plenum Fan only): Galvanized steel welded grid screen

4. Flexible Connection: Glass fabric double coated with neoprene.with minimum tensile strength of 480lbf/inch in the wrap and 360 lbf/inch in the filling, capable of withstanding up to 12” W.G. static pressure. Service temperature: minus 40 to 200 deg F

I. Vibration Isolation Base:

1. Select isolation devices for uniform static deflections according to distribution of weight. Minimum isolation efficiency shall be 90 - 95%. The minimum mounting deflection of spring isolators shall be as follows:

Operating Speed (RPM)	Min. Deflection (Inches)
300	3.50
500	2.00
800 and higher	1.00

J. Thrust restraints shall be designed to restrain the fan during start-up loads. Provide spring isolation with 1” deflection to prevent short-circuiting of the fan vibration to air handling unit.

2.9 FILTERS:

A. Filters:

1. Panel filters shall be 2” thick, high efficiency, pleated, disposable type. Each filter shall consist of glass fiber media, media support grid and enclosing frame. The filter shall be listed by Underwriters’ Laboratories as Class II. Filter sizes shall be limited to two sizes, 12”x24”x2” or 24”x24”x2” as specified on the drawings.

2. Medium efficiency pleated filters shall be 2” thick MERV 13 as rated by ASHRAE Standard 52.1 test methods. Filter media shall be of the non woven cotton fabric type. Filters shall be UL900 Class 2 listed

3. The enclosing frame shall be constructed of a rigid, heavy duty, high wet strength beverage board, with diagonal support members bonded to the air entering and air exit side of each pleat.

2.10 FILTER FRAMING SYSTEMS:

A. 16-gauge minimum galvanized steel framing members with access for upstream (front) filter servicing, cut to size and pre-punched for assembly into modules. Equip framing systems with gaskets, fasteners and filter centering dimples.

B. Filter fasteners shall be capable of being installed without tools, nuts, or bolts.

C. Vertically support the filters to prevent deflection of horizontal members without interfering with either filter installation or operation.

D. The entire enclosing frame assembly shall be caulked and then riveted or welded together such that the caulk presses out of the frame.

E. The entire filter frame system shall be composed of either 24”x24”, 24”x2” or 12”x24” individual modular holding frames.

2.11 AIR PRESSURE GAUGES:

A. Air Pressure Gauges: Furnish and install diaphragm actuated dial type differential pressure gauges complete with integral tips and valves, Magnehelic Series 2000 or equal. Accuracy shall be ±2% of full scale.

B. Ranges shall be as follows:

1. 0 to 1.0" of water for pre-filters

2. 0 to 4.0" of water for final filters

3. 0 to 5.0" of water for low pressure fans

4. 0 to 15.0" of water for high pressure fans

C. Provide thermometers were indicated in the H.V.A.C. Flow Diagram on the drawings.

D. Provide air pressure gauges at the following locations.

1. Each filter location on air handling system.

2. Each supply and return fan.

2.12 AIR THERMOMETERS:

A. Air thermometers shall be the adjustable angle bimetallic 5-1/2" dial type with stainless steel case (± 1/4% accuracy). Dial shall be the anti-parallel type with black figures and pointer.

B. Provide recalibration screw in the case for pointer adjustment. Provide duct flange for mounting and stem length of 8" minimum.

C. Temperature range shall be follows.

1. -10 to 120^{o}F upstream of cooling coils.

2. 0 to 80^{o}F downstream of cooling coils.

3. 0 to 80^{o}F in unit discharge plenums.

D. Calibrate thermometers in ice water before installation.

E. Provide air thermometers were indicated on the H.V.A.C. Flow Diagram on the drawings.

F. Provide air thermometers at the following locations:

1. All supply air from air handling units.

2. All outside air to air handling units.

3. In mixed air plenum of each air handling unit.

4. At discharge and entrance of each cooling coil.

5. At each duct thermostat or sensor if not located at one of the above.

G. Pneumatic transmission type thermometers are not acceptable.

2.13 PLENUMS:

A. All plenum sections of the air handling unit shall be pre-cut to the exact locations of the duct connections as shown on the drawings. Provide bell-mouth fittings at the discharge duct connections. The bell mouth fitting shall protrude through and mount flush with the interior skin of the plenum section.

2.14 MOTORS

A. Motor shall be NEMA Design B squirrel cage induction type designed for across-the-line starting.

B. Provide totally enclosed motors with cast-iron frames.

C. Constant speed motors shall be the premium energy efficient design of the motor manufacturer.

D. Torque Characteristics: Sufficient to accelerate driven loads satisfactorily. Temperature Rating: 50 deg C maximum temperature rise at 40 deg C ambient for continuous duty at full load (Class A Insulation).

E. Service Factor: 1.15 for polyphase motors.

F. Bearings: Motors shall have grease lubricated ball bearings designed to deliver a minimum L10 life of 250,000 hours at full load and the maximum operating RPM of the associated fan. Grease zerks and spring-loaded grease relief valves shall be provided in each motor to allow easy bearing lubrication without damaging the seals due to over lubrication. Permanently lubricated bearings are allowed if a spare motor per fan array is provided.

G. Motors for Division I locations shall have a T3C temperature code.

H. For efficient operation in a direct drive application, motors shall be capable of operating greater than 60HZ to at least the design operating speed of the fan.

I. Motors shall be factory wired to a motor control center for connection to a VFD. The motor control center shall include for each motor circuit a control device providing overload protection, short circuit protection and a manual disconnect means, and all circuits shall be wired to a common main panel terminal block. Each control device shall include an auxiliary output capable of providing remote notification of a motor failure. All motors shall operate at all times and be controlled in unison, maintaining a consistent and uniform airflow pattern over coils, filters and other devices.

J. Nameplate: Indicate full identification of manufacturer, ratings, characteristics, construction, and special features.

K. Motors Used With Variable Frequency Drives

1. Motors shall be totally enclosed, fan cooled, inverter-duty motors. Inverter-ready and inverter-rated motors are not acceptable.

2. Ratings, characteristics, and features shall be coordinated with and approved by the variable frequency drive manufacturer. Motors shall not be limited to use with the same manufacturer’s variable frequency drives.

3. Motors shall be designed with critical vibration frequencies outside operating range of controller output.

4. Motors shall comply with all of NEMA MG1, Part 31 “Definite Purpose Inverter-fed Motors.”

5. Motor Frames shall be cast iron construction.

6. Motor insulation systems shall consist of Class H or higher rated materials.

7. Temperature Rise: Matched to rating for Class B insulation.

8. Each motor shall be provided with a shaft grounding device to harmlessly bleed potential induced shaft voltages to ground.

2.15 ELECTRICAL / LIGHTS

A. In each section, provide a minimum of two 2-32 Watt (LED equivalent) lamps vapor-proof weather-tight LED, 4-ft. light fixtures with a low-temperature electronic ballast with less than 10% total harmonic distortion.

B. At each access entry and on the exterior skin of the unit, provide a SPDT pilot light switch wired to the light fixture through a sealed rigid steel conduit. All lights shall be wired in accordance to the National Electric Code.

C. Power to all the lights shall be wired back to a single point connection (junction box) external to the unit.

D. Air handling units are wet environments. Power and control wiring within air handling units shall be in rigid steel conduit and sealed airtight. Junction boxes and enclosures within air handling units shall be threaded cast aluminum with gasketed plate covers. Air handling unit conduit penetrations shall be sealed airtight. Controls (including valve and damper motors) inside air handling units shall be weatherproof.

E. Provide one 120 volt, weather-tight, GFI duplex electrical receptacle at each fan and filter section plus other locations as detailed on the drawings. Wire receptacle to same single point connection (junction box) external to the unit as the lights.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive units for compliance with requirements for installation tolerances and other conditions affecting unit performance. Examine proposed route of moving units into place and verify that it is free of interferences. Verify piping rough-in locations. Verify branch circuit wiring suitability. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Final locations of the units on the Drawings are approximate, unless dimensioned. Determine exact locations before roughing-in piping and electrical work.

3.2 INSTALLATION, GENERAL

A. General: Provide the labor, materials and equipment necessary to lift custom air handling units and set them in place, and assemble the unit sections in the locations shown on the drawings.

B. Anchor units to concrete pads in accordance with manufacturer's instructions and contract documents.

C. Units will be delivered to the project site in several sections. Maximum weight of each section will be 20,000#. Assemble unit sections in the locations shown on the drawings. Make any required connections between sections such as, fastening sections together, connecting piping and wiring, etc.

D. Install custom air-handling units level and plumb, according to manufacturer's written instructions.

1. Support floor-mounted units on concrete pads. Secure units to anchor bolts installed in concrete pad. Concrete pads must be dead level.

E. Arrange installation of units to provide access space around air-handling units for service and maintenance.

F. Some units will be built around structural members. Provide sheet metal and insulation between sections and seal airtight.

3.3 CONNECTIONS

A. The Drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

1. Arrange piping installations to allow unit servicing and maintenance.

2. Connect condensate drain pans using Type L copper tubing. Provide piping full size of unit drain outlets. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

3. Chilled Water Piping: Conform to applicable requirements of Division 23 sections. Connect to supply and return coil tappings as indicated.

B. The Drawings indicate the general arrangement of ducts and duct accessories. Make final duct connections as indicated.

C. Electrical: Conform to applicable requirements of Division 16 Sections.

D. Connect fan motors to wiring systems and to ground. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD PRESSURE TESTING

A. Pressure test units after sections have been assembled and before pipe and duct connections are made. 3% leakage is allowed. All controls, electric and piping penetrations must be in place before test.

1. Test pressure shall be 6 inches for the high pressure sections (supply fan discharge section and sections downstream.

2. Test pressure shall be 4 inches for the other unit sections.

3.5 ADJUSTING

A. Adjust water coil flow, with control valves to full coil flow, to indicated gpm.

B. Adjust damper linkages for proper damper operation.

3.6 CLEANING

A. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

B. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face.

3.7 STARTUP

A. Manufacturer's Field Inspection: The owner has engaged a factory-authorized service representative to perform the following:

1. Inspect field assembly of components and installation of central-station air-handling units including piping, ductwork, and electrical connections.

2. Prepare a written report on findings and recommended corrective actions.

B. Final Checks before Startup: Perform the following before startup:

1. Verify that shipping, blocking, and bracing are removed.

2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.

3. Perform cleaning and adjusting specified in this Section.

4. Verify proper motor rotation direction and verify free fan wheel rotation and smooth bearings operations.

5. Lubricate bearings and other moving parts with factory-recommended lubricants.

6. Comb coil fins for parallel orientation.

7. Verify that manual and automatic volume control, and smoke dampers in connected ductwork systems are in fully open position.

C. Starting procedures for custom air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel.

2. Measure and record motor electrical values for voltage and amperage.

3.8 DEMONSTRATION

A. Demonstration Services: Arrange and pay for a factory-authorized service representative to train Owner's maintenance personnel on the following:

1. Procedures and schedules related to start-up and shut down, troubleshooting, servicing, preventative maintenance, and how to obtain replacement parts.

2. Review operating and maintenance data contained in the Operating and Maintenance Manuals.

B. Schedule training with at least 7 days' advance notice.

END OF SECTION 237323

SECTION 238216.11 - HYDRONIC AIR COILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Hydronic air coils.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each air coil.
2. Include rated capacities, operating characteristics, and pressure drops for each air coil.

B. Sustainable Design Submittals:

1. Product data showing compliance with ASHRAE 62.1.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air coils to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. ASHRAE 62.1 Compliance: Comply with applicable requirements in ASHRAE 62.1, Section 5, "Systems and Equipment," and Section 7, "Construction and Startup."

B. Performance Ratings: Tested and rated in accordance with AHRI 410 and ASHRAE 33.

C. Minimum Working-Pressure/Temperature Ratings: 200 psig (1380 kPa)/300 deg F (149 deg C).

D. Select cooling coils for no moisture carryover at design conditions. Provide moisture eliminators on discharge face of cooling coil if necessary to eliminate moisture carryover.

2.2 HYDRONIC AIR COILS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Daikin.
2. Greenheck Fan Corporation.
3. USA Coil & Air.

B. Source Limitations: Obtain hydronic coils from single source from single manufacturer.

C. Description: Coils constructed of staggered tubes mechanically expanded into continuous collars that are die-formed into the coil fins; self-venting; counterflow design of air to fluid.

D. Tubes:

1. Material: Copper.
2. Nominal Diameter: Minimum 5/8 inch (16 mm) before expanding, selected to provide performance indicated.
3. Nominal Wall Thickness: As required by performance, minimum 0.035 inch (0.889 mm) thick.
4. Return Bends: 180-degree bends; material, wall thickness, and nominal diameter to match tubes.

E. Fins:

1. Type: Plate.
2. Materials:

    a. Aluminum: 0.01 inch thick.
3. Collars: Full collars for accurate fin spacing and maximum tube contact while leaving no surface of tube exposed.
4. Fin and Tube Joint: Mechanical bond.

F. Headers:

1. Material: Copper.
2. Tube-to-Header Connections: Tube-to-header holes to intrude inward, so landed surface area is 3 times the core tube thickness, to provide enhanced-header-to-tube joint integrity. Evenly extend tubes within the ID of the header no more than 0.12 inch (3 mm).
3. Header Top and Bottom Caps: End caps to be die-formed and installed on the ID of header, such that the landed surface area is 3 times the header wall thickness.
4. Drains: Include low point of supply and return header with a NPS 1/2 (DN 13) drain connection.
5. Vents: Include high point of supply and return header with a NPS 1/2 (DN 13) vent connection.
6. Supply and Return Connections: Copper pipe; threaded or flanged, same end of coil.
7. Protect opening of supply, return, vent, and drain connections with a threaded cap to prevent entry of dirt into coil.

G. Casings and Tube Sheets:

1. Depth: Extend coil casing and tube sheets a minimum of 1/2 inch (13 mm) beyond face of fins on both entering and leaving sides.
2. Materials:

    a. Cooling Coil: Stainless steel, Type 304, No. 2D finish, ASTM A240/A240M.

b. Heating Coil: Galvanized steel, ASTM A653/A653M, G90 (Z275) coating.

H. End Tube Sheets:

1. Tube sheet holes rolled to prevent chaffing of tubes during thermal expansion and contraction.
2. Flange face minimum of 1-1/2 inches (68 mm).
3. Thickness: Minimum of 16 gauge (1.6 mm) thick.

I. Intermediate Tube Sheets:

1. Tube sheet holes rolled to prevent chaffing of tubes during thermal expansion and contraction.
2. Space intermediate tube sheets a maximum of 48 inches (1200 mm) o.c. and locate to provide equal spacing between tube sheet across coil tube length.
3. Flange face minimum of 1/2 inch (13 mm).
4. Thickness: Minimum of 16 gauge (1.6 mm) thick.

J. Holes: Include number, size, and location of holes in casing and end tube sheets required for coil installation.

K. Hardware: Use hex-head bolts, nuts, and washers constructed of Type 304 stainless steel.

L. Nameplate: Aluminum or stainless steel nameplate with brass or stainless steel chain for each coil, with the following data engraved or embossed:

1. Manufacturer name, address, telephone number, and website address.
2. Manufacturer model number.
3. Serial number.
4. Manufacturing date.
5. Coil identification (indicated on Drawings).
6. Coil fin length.
7. Coil fin height.
8. Coil weight with fluid/without fluid.
9. Coil casing material and thickness.
10. Coil fin material and thickness.
11. Coil tube material and thickness.
12. Coil header material and thickness.

2.3 MATERIALS

A. Aluminum: ASTM B209 (ASTM B209M).

B. Copper Tube: ASTM B75/ASTM 75M annealed temper or ASTM B280 drawn temper.

C. Copper Sheet: ASTM B152.

D. 90/10 Cupronickel Alloy: ASTM B122/ASTM B122M.

E. Steel:

1. Pipe Connections: ASTM A53/A53M.

2.4 SOURCE QUALITY CONTROL

A. Hydronic Coils: Factory tested with air while coil is completely submerged underwater to design pressure indicated, but not less than 300-psig (2070-kPa) internal pressure.

B. Coils to display a tag with inspector's identification as proof of testing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine ducts, plenums, and casings to receive air coils for compliance with requirements for installation tolerances and other conditions affecting coil performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before coil installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install coils level and plumb.

B. Install coils in metal ducts and casings constructed in accordance with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."

C. Install stainless steel drain pan under each cooling coil.

1. Construct drain pans with connection for drain; insulated and complying with ASHRAE 62.1.
2. Construct drain pans to extend beyond coil length and width and to connect to condensate trap and drainage.
3. Extend drain pan upstream and downstream from coil face.
4. Extend drain pan under coil headers and exposed supply piping.

D. Install moisture eliminators for cooling coils. Extend drain pan under moisture eliminator.

E. Straighten bent fins on air coils.

F. Clean coils using materials and methods recommended in writing by manufacturers, and clean inside of casings and enclosures to remove dust and debris.

3.3 PIPING CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to coils to allow service and maintenance.

C. Connect water piping with unions and shutoff valves to allow coils to be disconnected without draining piping. Control valves are specified in Section 230923.11 "Control Valves," and other piping specialties are specified in Section 232116 "Hydronic Piping Specialties."

END OF SECTION 238216.11

SECTION 261116 - SECONDARY UNIT SUBSTATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A Unit substation.

1.02 RELATED REQUIREMENTS

A Section 033000 - Cast-in-Place Concrete: Pads for substation support.

B Section 260529 - Hangers and Supports for Electrical Systems.

1.03 REFERENCE STANDARDS

A ANSI C12.1 - Electric Meters - Code for Electricity Metering; 2022.

B IEEE C37.20.1 - IEEE Standard for Metal-Enclosed Low-Voltage (1000 Vac and Below, 3200 Vdc and Below) Power Circuit Breaker Switchgear; 2015, with Amendment (2020).

C IEEE C37.20.3 - IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC; 2023.

D IEEE C57.12.28 - IEEE Standard for Pad-Mounted Equipment -- Enclosure Integrity; 2014.

E IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.

F NEMA PB 2 - Deadfront Distribution Switchboards; 2011.

G NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.

1. Wiring Diagrams: Power, signal, and control wiring.

2. Dimensioned plans and elevations showing major componets and features.

3. List of materials.

4. Nameplate Legends

5. Size and number of bus bars and current ratings for each bus, including mains and branches of phase, neutral, and ground busses.

6. Short-time and short-circuit ratings of secondary unit substations and componets.

7. Ratings of individual protective devices.

B Time-Current Characteristic Curves: For overcurrent protective devices.

C Primary Fuses: Submit recommendations and size calculations.

D Operation Data: Include operating instructions for manually and electrically opening and closing circuit breakers.

E Maintenance Data: Include maintenance instructions for cleaning methods; cleaning materials recommended; instructions for circuit breaker removal, replacement, testing and adjustment, and lubrication; procedures for sampling and maintaining fluid.

1.05 QUALITY ASSURANCE

A Source Limitations: Obtain secondary unit substation through one source from a single manufacturer.

B Comply with requirements of NFPA 70.

C Comply with IEEE C2.

D Comply with IEEE C37.121-2020

1.06 SITE SPECIFIC REQUIREMENTS

A Footprint - this new unit substation is intended to be a replacement of an existing substation which resides on a concrete pad over an open cabling trench. The length of the complete unit substation cannot exceed 23 feet in length and 4 feet 8 inches in depth.

1.07 DELIVERY, STORAGE, AND HANDLING

A Protect products from weather and moisture by covering with heavy plastic or canvas and by maintaining heating within enclosure in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

A ABB

B Eaton Corporation

C Schneider Electric: www.se.com/#sle.

D Siemens Industry, Inc

2.02 UNIT SUBSTATIONS

A Description: Secondary unit substation comprising fused air switch primary section, transformer section, and low-voltage switchboard secondary section.

B Configuration: Radial type indoor unit arangement.

C Enclosure Finish: Factory applied finish in manufacturer's standard color, including under surfaces treated with corosion-resistant undercoating.

2.03 PRIMARY SWITCH RATINGS

A Nominal Voltage: 15 kV, three phase, 60 Hz.

B Voltage and Insulation Levels: Comply with IEEE C37.20.1.

C Main Bus Ampacity: 3000 amperes, continuous.

2.04 LIQUID - FILLED TRANSFORMER

A Capacity: 750 kVA.

B Primary Voltage: 15 kV delta connected.

C Taps: Standard primary tapsFour nominal 2.5 percent taps, two above and two below reated primary voltage; with externally operable tap changer for de-energized use and with postion indicator and padlock hasp.

D Secondary Voltage: 208 volts, wye connected.

E Impedance: 5 percent.

F Basic Impulse Level: 95 kV for primary, 30 kV for secondary.

G Winding material: Copper

H Insulating Liquid:

1. Less flammable, edible-seed oil based, and listed and labeled by a qualified electrical testing labratory as complying for with NFPA 70 requirements for fire point of not less than 300 deg C when tested in accordance with ASTM D92. Liquid must be biodegradable and nontoxic.

I Insulation Temperature Rise:

1. 55 deg C, based on an average ambient temperature of 86 deg F (30 deg C) over 24 hours with a maximum ambient temperature of 104 deg F (40 deg C). Insulation system must be rated to continuously allow an additional 12-percent kVA output, at 65 deg C temperature rise, without decreasing rated transformer life.

J Accessories: Grounding pads, lifting lugs, and provisions for jacking under base. Transformers must have a steel base and frame allowing use of pipe rollers in any direction, and insulated, low-voltgae, neutral bushing with removeable ground strap. Include the following additional accessories:

1. Liguid-level gage.

2. Pressure-vacuum gage.

3. Liquid temperature indicator.

4. Drain and filter valves.

5. Pressure-relief device.

2.05 INCOMING SECTION EQUIPMENT

A Fused Air Interrupter Switch: IEEE C37.20.3, two position.

B System Voltage: 15 kV, three phase, 60 Hz.

C Three pole, single throw, dead front, top feed, metal enclosed, with manual stored energy operator, with fuses mounted on a single frame, complying with IEEE C37.20.3.

D Key interlocking system to prevent fuse access door from being opened unless switch is open. Additionally, interlock air-interupter switch with transformer secondary main circuit breaker, preventing switch from being opened or closed unless secondry main circuit breaker is open.

E Phase Barriers: Located between blades and fuses of each phase, designed for easy removal, allowd visual inspection of switch componets when barrier is in place.

F Window: Permits viewing switch-blade position when door is closed.

G Accessory Set: Tools and miscellaneous items required for interrupter switchgear test, inspection, maintenance, and operation. Include fuse-handling tool as reccommended by switchgear manufacturer.

H Continuous Rating: 600 amperes copper.

I Short Circuit Rating:

1. Short-time momentary asymmetrical fault rating of 40 kA.

2. 3-second symmetrical rating of 25kA RMS.

3. Fault close asymmetrical rating of 40 kA.

J Fuses: Sizes reccommended by secondary unit substation manufacturer, considering fan cooling, temperature-rise specification, and cycle loading. Comply with the following:

1. Current limiting one time type, rated for not less than 50-kA RMS symmetrical current-interupting capcity.

2. Indicator integral with each fuse to show when it has blown.

3. Spares: Include three fuses in use and three spare fuses in storage clips in each switch.

K Surge Arresters: Comply with IEEE C62.11, Distribuition class; metal-oxide-varistor type, with ratings as indicated, connected in each phase of incoming circuit and ahead of any disconnecting device.

2.06 OUTGOING SECTION EQUIPMENT

A Description: Switchboard manufactured to NEMA PB 2.

B Main Section Devices: Individually mounted.

C Sections front and rear aligned.

D Bus Material: Copper.

E Bus Rating: 65KAIC

F Indoor Enclosures: Steel, NEMA 250, Type 1.

G Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

H Isolation for main bus of main section and main and vertical buses of feeder sections.

I Bus Transitions and Incoming Pull Sections: Matched and aligned with basic switchboard.

J Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

K Pull box on Top of Switchboard (if required):

1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.

2. Set back from front to clear circuit-breaker removal mechanism.

3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.

4. Bottom shall be insulating, fire-resistive material with seperate holes for cable drops into switchboard.

L Buses and Connections: Three-phase, four-wire unless otherwise indicated.

1. Phase, Neutral, and Ground Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated, with copper feeder circuit-breaker line connections.

2. Load Terminals: Insulated, rigidly braced, runback bus extension, of same material as through buses, equipped with compression connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker position.

3. Ground Bus: 1/4-by-2 inch-(6-by-50mm) Minimum size required by UL 891 unless otherwise noted, hard-drawn copper of 98 percent conductivity, equipped with compression connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.

4. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions.

5. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with compression connectors for outgoing neutral cables, Brace bus extensions for busway feeder neutral bus.

M Future Devices: Equip compartments with mounting brackets, supports, bus connections. and appurtenances at full rating of circuit-breaker compartment.

N Power Circuit Breakers: IEEE C37.20.1, factory-assembled electrically-operated low-voltage air circuit breakers, stationary mounting. Include electronic sensing, timing and tripping circuits for adjustable current, long-time pickup and long-time delay; ground-fault pickup and delay; adjustable instantaneous pickup; short-time pickup and delay. Ground fault sensing shall be integral with circuit breaker.

2.07 TRANSIENT VOLTAGE SUPRESSION DEVICES

A Manufacturers: Subject to compliance with requirements, available manufactureres offering products that may be incorporated into the work include, but are not limited to the following:

1. Eaton Electrical Inc; Cutler-Hammer Business Unit.
2. ABB.
3. Siemens Energy & Automation, Imc.
4. Square D; a brand of Schneider Electric.

B Surge Protection Device Description: IEEE C62.41-compliant, integrally or seperately mounted, bolt-on, solid-state, parallel connected, modular (with field replacable modules) type, with sine-wave tracking suppression and filtering modules, UL 1449, second edition, short circuit current rating matching or exceeding the switchboard short-circuit rating, and with the following features and accessories:

1. Fuses, rated ad 200kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Redundant supression circuits.
5. Redundant replacable modules.
6. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
7. LED indicator lights for power and protection status.
8. Audible alarm, with silencing switch to indicate when protection has failed.
9. Six-digit, transient-event counter set to totalize transient surges.

C Peak Signal-Impulse Surge Current Rating: 160kA per mode/320 kA per phase.

D Withstand Capabilities: 12,000 IEEE C62.41, Category C3 (10 kA), 8 by 20 mic.sec. surges with less than 5 percent change in clamping voltage.

E Protection modes and UL 1449 SVR for grounded wye circuits with 208Y/120V, three phase, four wire circuits shall be as follows:

1. Line to Neutral: 400 V for 208Y/120V.
2. Line to Ground: 400 V for 208Y/120V.

3. Neutral to Ground: 400 V for 208Y/120V.

2.08 DISCONNECTING AND OVERCURRENT PROTECTION DEVICES

A Drawout type Main Breaker: Comply with UL 489, with interrupting capcity to meet available fault currents.

B Molded Case Circuit Breaker: Comply with UL 489, with interrupting capcity to meet available fault currents.

1. Electronic trip circuit breakers with RMS sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

a. Instantaneous trip.

b. Long- and short-time pickup levels.

c. Long- and short-time time adjustments.

d. Ground-fault pickup level, time delay, and I^2t response.

e. Provide remotely controlled circuit breakers where indicated on drawings.

2.09 INSTRUMENTATION

A Instrument Transforemers: IEEE C57.13, NEMA EI 21.1, and the following:

1. Potential Transformers: IEEE C57.13, 120 V, 60 Hz, single secondary; deisconnecting type with integral fuse mountings. Burden and accuracy shall be consistent with connected metering and relay devices.

2. Current Transfomers: IEEE C57.13; 5 A, 60 Hz, secondary; wound type; single secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.

3. Control-Power Transfomers: Dry type, mounted in seperate compartments for units larger than 3 kVA.

4. Current Transformers for Neutral and Fround Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shortign terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit breaker, fround fault proteciton.

B Multifunction Digital-Metering Monitor:

1. Manufacturers: Subject to compliance with requirements, avilable manufacturers offering products that may be incorporated into the work are:

a. Schneider PM5563 (or Schneider PM5563RD for remote display)

b. Eaton PXM2000 (or Eaton PXM2000T for remote display)

c. Shark 250 with PROTOCOM BACnet Gateway Kit.

2. The meter shall have a BACnet interface.

3. COmmunications interface to the BAS for providing output of all monitored and stored information to the owner's facility management system. Coordinate with BAS installer to provide the required hardware and accessories. Provide all necessary communication cabling and connections to establish this connection.

4. Mounting: Display and control unit flush or semi-flush mounted in instrument compartment foor. Mounting height for the meter shall be no higher than 5 feet above finished floor.

5. Seperately mounted molded case chircuit breaker fo rmeter protection and isolation.

2.10 CONTROL POWER

A Control Circuits: 120-V ac, supplied through secondary disconnecting devies from control power transformer.

B Control Power Fuses: Primary and secondary fuses for current-limiting and overload protection of transformer and fuses for protection of control circuits.

C Control Wiring; Factory installed, with bunding, lacing, and protection included. Provide flexible conductors for No. 8 AWG and smaller, for conductors across the hinges, and for conductors for interconnections between shipping units.

2.11 ACCESSORIES

A Circuit Breaker Lifting Device: Portable, floor supported, elevating carriage with a roller base, for movement of circuit breakers in and out of switchboard structure.

B Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.

2.12 FABRICATION

A Enclosure: Comply with requirements of IEEE C57.12.28.

B Construction: Indoor.

2.13 FACTORY FINISHES

A Clean surfaces before applying paint.

B Apply corrosion-resisting primer to all surfaces.

C Apply finish coat of baked enamel paint to 2 mils (0.5 mm) thick.

D Finish Color: Manufacturer's standard gray finish.

PART 3 EXECUTION

3.01 IDENTIFICATION

A Operating Instructions: Frame printed operating instructions for secondary unit substations, including key interlocking, control sequences, elementary single line diagram, and emergency procedures. Fabricate frame of finished wood or metal and cover instrucitons with clear acrylic plastic. Mount on front of secondary unit susbstation.

B Compartment Nameplate: Engraved, laminated-plastic or metal nameplate for each compartment, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

END OF SECTION 261116

GENERAL NOTE:

1. PROVIDE COPY OF ALL COMPLETED PANEL SCHEDULES IN THE O & M MANUAL.
2. ALL A.I.C. RATINGS OF SWITCHBOARDS, DISTRIBUTIONBOARDS, AND BRANCH PANELBOARDS ARE TO MEET THE REQUIREMENTS/RECOMMENDATIONS OF THE FAULT CURRENT COORDINATION STUDY.

0PL1

LOCATION: ELEC 51 **VOLTAGE:** 208Y/120 **SCCR. RATING:**
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN CB
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 200 AMPS
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 200 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1	RCPT CLASSROOM AV/IT 065	20 A	1	720 VA	540 VA					1	20 A	RCPT CLASSROOM AV/IT 065	2
3	RCPT CLASSROOM AV/IT 065	20 A	1			1440...	1080...			1	20 A	RCPT CLASSROOM AV/IT 065	4
5	RCPT AT/IV OFFICE 065C	20 A	1					360 VA	360 VA	1	20 A	RCPT AT/IV OFFICE 065C	6
7													8
9													10
11	RCPT MDF 014	30 A	2					2496...	360 VA	1	20 A	Power CLASSROOM AV/IT 065	12
13				2496...	360 VA					1	20 A	Power CLASSROOM AV/IT 065	14
15	Power CLASSROOM AV/IT 065	20 A	1			360 VA	180 VA			1	20 A	RCPT STAIRS NR.7-1 ST-C-1	16
17													18
19													20
21													22
23	LTG/RECPT CORR. CB-01-E& 63-A	20 A	1					1800...	1800...	1	20 A	LTG/RECPT EQUIP RM CB08	24
25	LTG - EQUIP RM CB 63	20 A	1	1800...	1800...					1	20 A	LTG/RECPT SUPPLY 06	26
27	ITG - EQUIP RM CB 63	20 A	1			1800...	1800...			1	20 A	LTG - RECEIVING CB 59 & CB 55	28
29	WATER COOLER CORR CB-01-N	20 A	1					1800...	1800...	1	20 A	LTG - REVIEVING CB 59 & CB 57	30
31	WALL & FLOOR RECPT RM 55	20 A	1	1800...	1800...					1	20 A	RECPT - RECEIVING CB 59 & CORR CB-01-N	32
33	DOCK DOOR & 3 HEATERS	20 A	1			1800...	1800...			1	20 A	RECPT & UNIT HEATER CB-57	34
35	RECPT & EQUIP RM CB-63	20 A	1					1800...	1800...	2	30 A	INVERTER ROOM 74A	36
37	RECPT - CB 63A	20 A	1	1800...	1800...								38
39	HEATERS LOADING DOCK	20 A	2			1800...	1800...			1	20 A	INVERTER RM CB-08	40
41								1800...	1800...	1	20 A	RECPT CB-01-E & CB-01-N	42
			TOTAL LOAD:	14916 VA		13860 VA		17976 VA					
			TOTAL AMPS:	126 A		116 A		151 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LO = LOCK OUT DEVICE
LN = LOCK ON DEVICE

PANELBOARD NOTES:

0DH1

LOCATION: MECHANICAL 053 **VOLTAGE:** 480Y/277 **SCCR RATING:**
SUPPLY FROM: T-1 **PHASE:** 3 **MAIN TYPE** MAIN CB
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 600
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 500 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1				2214...	2214...								2
3	AHU-1	100 A	3			2214...	2214...			3	100 A	AHU-2	4
5								2214...	2214...				6
7				2214...	2214...								8
9	AHU-3	100 A	3			2214...	2214...			3	100 A	AHU-4	10
11								2214...	2214...				12
13				6208...	6208...								14
15	RETURN FAN 1	30 A	3			6208...	6208...			3	30 A	RETURN FAN 2	16
17								6208...	6208...				18
19				6208...	6208...								20
21	RETURN FAN 3	30 A	3			6208...	6208...			3	30 A	RETURN FAN 4	22
23								6208...	6208...				24
			TOTAL LOAD:	113400 VA		113400 VA		113400 VA					
			TOTAL AMPS:	409 A		409 A		409 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LO = LOCK OUT DEVICE
LN = LOCK ON DEVICE

PANELBOARD NOTES:

SWBD

LOCATION: MECHANICAL 053 **VOLTAGE:** 208Y/120 **SCCR. RATING:** 65,000
SUPPLY FROM: **PHASE:** 3 **MAIN TYPE:** MCB
MOUNTING: CONCRETE PAD **WIRES:** 4 **BUS RATING:** 3000
ENCLOSURE TYPE: NEMA 1 **MCB RATING:** 3000 A

CKT #	CIRCUIT DESCRIPTION	POLES	TRIP RATING	LOAD	REMARKS
1	T-1	3	1200 A	340199 VA	
2	0PL1	3	225 A	46752 VA	
3	0PL2	3	250 A	73800 VA	
4	0PL3	3	225 A	103680 VA	
5	0PL4	3	225 A	28392 VA	
6	1DL1	3	400 A	78676 VA	
7	1DL2	3	400 A	94992 VA	
8	2DL1	3	400 A	43057 VA	
9	2DL2	3	400 A	44340 VA	
10	3DL1	3	400 A	37555 VA	
11	3DL2	3	400 A	39579 VA	
12	EXISTING PANEL CB-53-1	3	100 A	0 VA	
13	SPARE	3	225 A	0 VA	
14	SPARE	3	400 A	0 VA	
15	SPARE	3	100 A	0 VA	
16	SPACE	1	--	--	
			TOTAL LOAD:	931021 VA	
			TOTAL AMPS:	2584 A	

CIRCUIT BREAKER NOTES:
SH = SHUNT TRIP
GFI = GFCI CIRCUIT BREAKER (PERSONAL PROTECTION)
GFE = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
LN = LOCK ON DEVICE
LO = LOCK OUT DEVICE

SWITCHBOARD NOTES:

0PL4

LOCATION: ELEC 023 **VOLTAGE:** 208Y/120 **SCCR. RATING:** 0
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN LUG
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 250
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 225 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1													2
3													4
5	RCPT MDF 016	30 A	2					2496...					6
7				2496...									8
9													10
11													12
13													14
15													16
17	LTG CORR 01-N	20 A	1					1800...	1800...	1	20 A	LTG/RECPT CORR 01-W	18
19	LTG/RECPT RM 02 & 10	20 A	1	1800...	1800...					1	20 A	LTG/RECPT RM 47, 47B, 47C	20
21	LTG RM 0B-23	20 A	1			1800...	1800...			1	20 A	LTG RM 04	22
23	RECPT - RM 0B-23	20 A	1					1800...	1800...	1	20 A	RECPT - RM 04, WATER COOLER	24
25	RECPT - CORR 01-N, RM CB-2 COUNTER...	20 A	1	1800...	1800...					1	20 A	BATHROOM GFI REC / HALLEAY SINGLE...	26
27	RM CB-2 LT SIDE GFI RECPT	20 A	1			1800...	0 VA			1	20 A	SPARE	28
29	RM CB-2 UNDER COUNTER RT GFI RECPT	20 A	1					1800...	1800...	1	20 A	RM CB-2 WASHER GFI RECPT	30
			TOTAL LOAD:	9696 VA		5400 VA		13296 VA					
			TOTAL AMPS:	86 A		45 A		116 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GCI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LO = LOCK OUT DEVICE
LN = LOCK ON DEVICE

PANELBOARD NOTES:

0PL3

LOCATION: **VOLTAGE:** 208Y/120 **SCCR. RATING:** 0
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN LUG
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 250
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 250 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1	SPARE	20 A	1	0 VA	0 VA					1	20 A	SPARE	2
3	SPARE	20 A	1			0 VA	0 VA			2	20 A	SPARE	4
5	SPARE	20 A	1					0 VA	0 VA				6
7	SPARE	20 A	1	0 VA	0 VA					1	20 A	SPARE	8
9	SPARE	20 A	1			0 VA	1800...			1	20 A	LTG CB 25	10
11	PLUG MOLD RECPT RM 29B	20 A	1					1800...	1800...	1	20 A	PLUG MOLD RECPT RM 29B	12
13	SPARE	20 A	1	0 VA	1800...					1	20 A	PLUG MOLD RECPT RM 29B	14
15	SPARE	20 A	1			0 VA	0 VA			1	20 A	SPARE	16
17	SPARE	20 A	1					0 VA	1800...	1	20 A	VENDING	18
19	SPARE	20 A	1	0 VA	0 VA					1	20 A	SPARE	20
21	RCPT CUSTODIAL OFFICE 091	20 A	1			720 VA							22
23	RCPT CUSTODIAL OFFICE 091	20 A	1					360 VA					24
25													26
27													28
29													30
31	LTG - CORR 01-S	20 A	1	1800...	1800...					1	20 A	LTG/RECPT RM 41 & 39 FAN	32
33	LTG ON 3-EAY-SWS CORR 01-S	20 A	1			1800...	1800...			1	20 A	RECPT RM 41 & 37	34
35	LTG PAST OFFICE LOBBY	20 A	1					1800...	1800...	1	20 A	RECPT RM 37 AND TUNNEL	36
37	XEROX CB-29	20 A	2	1800...	1800...					1	20 A	LTG POST OFFICE LOBBY & COUNTER	38
39						1800...	1800...			1	20 A	LTG CRAWL SPACE	40
41	LTG POST OFFICE LOBBY	20 A	1					1800...	1800...	1	20 A	RECPT RM 37, 21, 29	42
43	RECPT RM 37	30 A	1	1800...	1800...					1	20 A	RECPT RM 37 & VAULT 21-A	44
45	30 AMP PLUG RM CB-24	30 A	1			1800...	1800...			1	20 A	CB 23	46
47	RECPT CB 29	20 A	1					1800...	1800...	1	20 A	SPARE	48
49	LTG/RECPT IN TUNNEL	20 A	1	1800...	1800...					1	20 A	LTG POST OFFICE RM 21	50
51	LTG WORK AREA 29 & VAULT 21A	20 A	1			1800...	1800...			1	20 A	LTG POST OFFICE RM 21	52
53	LTG WORK AREA RM 29	20 A	1					1800...	1800...	1	20 A	LTG POST OFFICE RM 21	54
55	LTG RM CB-37	20 A	1	1800...	1800...					1	20 A	PLUG MOLD RECPT CB-37	56
57	LTG RM CB-37	20 A	1			1800...	1800...			1	20 A	PLUG MOLD RECPT CB-37	58
59	30 AMP RECPT CB-37	30 A	1					1800...	9600...	3	100 A	100A PANEL	60
61	PLUG MOLD RECP CB-37	20 A	1	1800...	9600...								62
63	PLUG MOLD RECPT WORK AREA RM 29	20 A	1			1800...	9600...						64
65	KODAK COPIER RM 29	20 A	2					1800...	1800...	2	20 A	KODAK COPIER RM 29	66
67				1800...	1800...								68
69	SPACE	--	1			--	1800...			1	20 A	20 AMP RECPT RM CB-37	70
71													72
			TOTAL LOAD:	34800 VA		33720 VA		35160 VA					
			TOTAL AMPS:	291 A		281 A		294 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GFCI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LN = LOCK ON DEVICE

PANELBOARD NOTES:
CIRCUITS 1-20 ARE FED FROM EXISTING PANEL CB-21E-B
CIRCUITS 31-72 ARE FED FROM EXISITNG PANEL CC

0PL2

LOCATION: STORAGE 074 **VOLTAGE:** 208Y/120 **SCCR. RATING:** 0
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN LUG
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 250
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 225 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1													2
3													4
5													6
7													8
9													10
11													12
13	LTG EQUIP RM 69 & RM 73	20 A	1	1800...	1800...					1	20 A	RECPT - CB-23	14
15	RECPT EQUIP RM 71 & 69	20 A	1			1800...	1800...			1	20 A	RECPT - CB-23	16
17	LTG - RM 05	20 A	1					1800...	1800...	1	20 A	RECPT - CB-21	18
19	LTG RM 03	30 A	2	1800...	1800...					1	20 A	RECPT - RM 03	20
21						1800...	1800...			1	20 A	LTG - RM 03	22
23	SUMP PUMP RECPT ELEV	20 A	1					1800...	1800...	1	20 A	QUAD RECPT WEST WALL RM 9	24
25	QUAD RECPT WEST WALL RM 9	20 A	1	1800...	0 VA					1	20 A	PLUG MOLD RECPT RM 71	26
27	RECPT - RM 71 & 03	20 A	1			1800...	1800...			1	20 A	PLUG MOLD RECPT RM 05	28
29	PLUG MOLD RECPT RM 71	20 A	1					1800...	1800...	1	20 A	PLUG MOLD RECPT RM 05	30
31	ISODUCT WRFL	20 A	1	1800...	1800...					1	20 A	PLUG MOLD RECPT RM 03	32
33	RECPT FOR MAIL ROOM CB-3	20 A	1			1800...	1800...			1	20 A	PLUG MOLD RECPT RM 03	34
35	MIDDLE WAIT RECPT RM 71	20 A	1					1800...	1800...	1	20 A	20 AMP RECPT NORTH WALL CB 71	36
37	30 AMP RECPT SOUTH WALL CB05	20 A	1	1800...	1800...					1	20 A	QUAD RECPT RM 69 & 69A	38
39	30 AMP RECPT CORR 01-S	20 A	1			1800...	1800...			1	20 A	30 AMP RECPT SOUTH WALL CB05	40
41	AC UNITS WRFL	20 A	2					1800...	1800...	1	20 A	BELL & HOWELL INSERTER	42
43				1800...	1800...					1	20 A	30 AMP RECPT NORTH WALL CB-05	44
45	CB21A PRINTER	20 A	1			1800...	1800...			1	20 A	SPARE	46
47	CB21A OFFICE FURNITURE RECPT	20 A	1					1800...	1800...	1	20 A	SPARE	48
49	SPARE	20 A	1	1800...	1800...					2	30 A	UPS POST OFFICE	50
51	SPARE	20 A	1			1800...	1800...						52
53	ELEV ROOM FAN	20 A	1					1800...	1800...	1	20 A	ISO DUCT WRFL	54
				23400 VA		25200 VA		25200 VA					
			TOTAL AMPS:	195 A		212 A		212 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
** = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
** = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LO = LOCK OUT DEVICE
LN = LOCK ON DEVICE

PANELBOARD NOTES:

1L1

LOCATION: ELEC 123 **VOLTAGE:** 208Y/120 **SCCR. RATING:**
SUPPLY FROM: 1DL1 **PHASE:** 3 **MAIN TYPE** MAIN LUG
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 250
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 225 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1	LTG - OPEN COLLABORATION 100B	20 A	1	1692...	1296...					1	20 A	LTG - NORTH LOBBY PENDANTS 100B	2
3	LTG - NORTH LOBBY PENDANTS 100B	20 A	1			972 VA	1746...			1	20 A	LTG - SOUTH LOBBY 100	4
5	LTG - SOUTH LOBBY PENDANTS 100B	20 A	1					1620...	1918...	1	20 A	LTG - LECTURE ROOM 106	6
7	LTG - SOUTHLOBBY PENDANTS 100B	20 A	1	1296...	2160...					1	20 A	LTG - CORRIDOR 100A	8
9	LTG - LECTURE ROOM 108	20 A	1			1918...	1455...			1	20 A	LTG - AUDITORIUM 110	10
11	LTG - AUDITORIUM 110	20 A	1					1336...	1380...	1	20 A	LTG - CLASSROOM 112	12
13	LTG - CLASSROOM 102	20 A	1	1380...	1436...					1	20 A	LTG - AUDITORIUM 104	14
15	LTG - AUDITORIUM 104	20 A	1			1355...	1376...			1	20 A	LTG - EAST CIRCULATION 100C	16
17	TRACK LTG LECTURE ROOM 106	20 A	1					180 VA	180 VA	1	20 A	TRACK LTG LECTURE ROOM 106	18
19	TRACK LTG AUDITORIUM 104	20 A	1	180 VA	180 VA					1	20 A	TRACK LTG LECTURE ROOM 106	20
21	TRACK LTG AUDITORIUM 104	20 A	1			180 VA	180 VA			1	20 A	TRACK LTG AUDITORIUM 104	22
23	TRACK LTG AUDITORIUM 104	20 A	1					180 VA	180 VA	1	20 A	TRACK LTG AUDITORIUM 104	24
25	TRACK LTG AUDITORIUM 110	20 A	1	180 VA	180 VA					1	20 A	TRACK LTG AUDITORIUM 110	26
27	TRACK LTG AUDITORIUM 110	20 A	1			180 VA	180 VA			1	20 A	TRACK LTG AUDITORIUM 110	28
29	TRACK LTG LECTURE ROOM 108	20 A	1					180 VA	180 VA	1	20 A	TRACK LTG AUDITORIUM 110	30
31	TRACK LTGLECTURE ROOM 108	20 A	1	180 VA	180 VA					1	20 A	TRACK LTG LECTURE ROOM 108	32
33	EXTERIOR COLOR CHANGING FIRST FLOOR	20 A	1			448 VA	480 VA			1	20 A	FRESCO DEVICE ELEC 123	34
35	RCPT OPEN COLLABORATION 100B	20 A	1					540 VA	720 VA	1	20 A	RCPT Room 114-1, 114A	36
37	RCPT OPEN COLLABORATION 100B	20 A	1	720 VA	540 VA					1	20 A	RCPT LECTURE ROOM 106	38
39	RCPT AV RACK RM 108	20 A	1			360 VA	360 VA			1	20 A	RCPT AV RACK RM 106	40
41	RCPT LECTURE ROOM 108	20 A	1					540 VA	540 VA	1	20 A	LECTERN FLOOR BOX RM 104	42
43	LECTERN FLOOR BOX RM 110	20 A	1	540 VA	360 VA					1	20 A	RCPT AUDITORIUM 104	44
45	RCPT AUDITORIUM 110	20 A	1			360 VA	2496...			2	30 A	RCPT IDF 119	46
47									2496...				48
49													50
51													52
53													54
55													56
57													58
59													60
			TOTAL LOAD:	12500 VA		14046 VA		12170 VA					
			TOTAL AMPS:	105 A		117 A		101 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LN = LOCK ON DEVICE

PANELBOARD NOTES:

1DL2

LOCATION: ELEC 137 **VOLTAGE:** 208Y/120 **SCCR. RATING:**
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN CB
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 400 AMPS
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 400 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1				1743...	1620...								2
3	1L3	225 A	3			1512...	1602...			3	225 A	1L4	4
5								1581...	1440...				6
7													8
9													10
11													12
			TOTAL LOAD:	33636 VA		31140 VA		30216 VA					
			TOTAL AMPS:	281 A		261 A		252 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
L = LIGHTING LOAD
GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
GFE = GFI CIRCUIT BREAKER (EQUIPMENT PROTECTION)
SH = SHUNT TRIP
LO = LOCK OUT DEVICE
LN = LOCK ON DEVICE

PANELBOARD NOTES:

1DL1

LOCATION: ELEC 123 **VOLTAGE:** 208Y/120 **SCCR. RATING:**
SUPPLY FROM: SWBD **PHASE:** 3 **MAIN TYPE** MAIN CB
MOUNTING: SURFACE **WIRES:** 4 **BUS RATING:** 400 AMPS
ENCLOSURE TYPE: NEMA1 **MCB RATING:** 400 A

CKT #	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT #
1				1250...	1242...								2
3	1L1	225 A	3			1404...	1368...			3	225 A	1L2	4
5								1217...	1386...				6
7													8
9													10
11													12
			TOTAL LOAD:	24920 VA		27726 VA		26030 VA					
			TOTAL AMPS:	208 A		232 A		218 A					

CIRCUIT BREAKER NOTES:
R = RECEPTACLE LOAD
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GFI = GFCI CIRCUIT BREAKER (PERSONNEL PROTECTION)
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SH = SHUNT TRIP
LO = LOCK OUT DEVICE
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PANELBOARD NOTES:

SHERMAN CARTER BARNHART ARCHITECTS

DRAFT

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UNIVERSITY OF KENTUCKY WHITEHALL RENOVATION & ADDITION
140 Patterson Dr, Lexington, KY 40506

ELECTRICAL PANEL SCHEDULES

JOB NO.	2302
DATE	7/22/2024
DRAWN	RPG
CHECKED	WPW

REVISIONS

No.	Description	Date

SHEET
E8.0

2302
UNIVERSITY OF KENTUCKY WHITEHALL RENOVATION & ADDITION
8/1/2024 2:37:23 PM