

DATE: September 28, 2026

State of Illinois
CAPITAL DEVELOPMENT BOARD

TO: PROSPECTIVE OFFERORS

SUBJECT: AMENDMENT NO. 4 TO THE RFP FOR

CDB Project 830-030-167
Construct a Drug Discovery and Cancer Research Pavilion
University of Illinois Chicago
Chicago, Cook County, Illinois

This amendment forms a part of the RFP and contract documents and modifies the original RFP posted April 15, 2026. Acknowledge receipt of this amendment in the space provided on the Proposal Transmittal Form. FAILURE TO DO SO MAY SUBJECT BIDDER TO DISQUALIFICATION.

BRIDGING DOCUMENTS:

1. ADD the attached “**Bridging Documents Addendum 01**” and “**Bridging Documents Addendum 02**”.

CDB hereby issues this Amendments to provide minor revisions to specific sections of the DDGRP Design-Build Bridging Documents referenced in the RFP. These revisions clarify requirements and performance criteria but do not constitute a replacement of the full bridging document set.

Offerors shall review the revised sections included with the attached Addendums and incorporate all applicable updates into their technical and price proposals. Except as modified herein, all other bridging document content remains unchanged and in full force. Offerors must acknowledge receipt of this Amendment in their Proposal Acknowledgment Form.

Very truly yours,

CAPITAL DEVELOPMENT BOARD

This amendment consists of 1 total page plus the following attachments.

Attachments: Bridging Documents Addendum 01
Bridging Documents Addendum 02

ADDENDUM

01

TO: State of Illinois Capital Development Board
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DATE: 09/22/2026

PROJECT: Drug Discovery and Cancer Research Pavilion
For University of Illinois Chicago
CDB Project #: 830-030-167

H&R
PROJECT
NO. 16141

OWNER: State of Illinois Capital Development Board

1. This Addendum defines revisions to the Bridging Documents.
2. This Addendum may include revised or added pages, documents, and/or Drawings that are to be inserted in the correct sequence in the Bridging Documents.
3. This Addendum shall be acknowledged on the Bid Form and incorporated into the proposed Contract Sum and Contract Time.
4. When text pages are reissued, modifications are indicated as follows: Revised or added text is shown in **bold underline** face type. Deleted text is shown as ~~strike through~~.

DESCRIPTION

This addendum reflects the following categories of revisions:

Item 1	Updates to commissioning agent materials (Owner's Project Requirements, Commissioning Plan, added Specification).
Item 2	Updates to the architectural, mechanical and electrical narratives in coordination with aforementioned updates to commissioning agent materials.

MATERIALS ATTACHED

The following pages are updated or expanded upon:

4	(TABLE OF CONTENTS)
63	(Part of 4.0 CODES + STANDARDS // 4.2 APPLICABLE CODES)
125	(Part of 7.0 ARCHITECTURAL CRITERIA // 7.1 BUILDING EXTERIOR)
128	(Part of 7.0 ARCHITECTURAL CRITERIA // 7.1 BUILDING EXTERIOR)
158	(Part of 8.0 SYSTEM CRITERIA // 8.2 MECHANICAL SYSTEMS)
161	(Part of 8.0 SYSTEM CRITERIA // 8.2 MECHANICAL SYSTEMS)
288	(Part of 8.0 SYSTEM CRITERIA // 8.5 ELECTRICAL & FIRE ALARM SYSTEMS)
342-343	(Part of 8.0 SYSTEM CRITERIA // 8.5 ELECTRICAL & FIRE ALARM SYSTEMS; note new pages 342a and 342b incorporated)

378 (Part of 8.0 SYSTEM CRITERIA // 8.5 ELECTRICAL & FIRE ALARM SYSTEMS)

The following sections are updated:

13.9 OWNER'S PROJECT REQUIREMENTS

13.12 COMMISSIONING PLAN

The following sections are being issued for the first time:

13.16 BUILDING ENCLOSURE COMMISSIONING SPECIFICATION

PREPARED BY
Holabird & Root, LLC
Laura Gabel AIA

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10.0 ROOM-SPECIFIC CRITERIA

- 10.1 LAB SPACES
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- 12.2 CONCEPTUAL FLOOR PLANS
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- 12.6 CONCEPTUAL STRUCTURAL PARTI

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- 13.5a SITE ENVIRONMENTAL REPORT
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- 13.11 EXISTING DRAWINGS FOR COLLEGE OF PHARMACY BUILDING
- 13.12 COMMISSIONING PLAN
- 13.13 COMMISSIONING SPECIFICATION
- 13.14 SITE SOUND EVALUATION
- 13.15 LEED SCORECARD
- 13.16 BUILDING ENCLOSURE COMMISSIONING SPECIFICATION**

4.2 APPLICABLE CODES

The following is a list of governing codes:

- International Building Code – IBC 2024 Edition (excluding Chapter 11)
- International Existing Building Code – IEBC 2024 Edition
- International Fire Code – IFC 2024 Edition
- International Mechanical Code – 2024 Edition
- International Property Maintenance Code – IPMC 2024 Edition
- National Electrical Code NFPA 70 – NEC (latest edition adopted by Authority Having Jurisdiction (AHJ))
- Illinois Elevator Safety and Regulation Act – ASME A17.1 2019 Edition
- Illinois Plumbing Code – IPC 2014 Edition
- Illinois Environmental Barriers Act – IEBA 2017 Edition
- Illinois Accessibility Code 2018 – IAC
- Illinois Stretch Energy Code, 20 ILCS 3125/55 (~~latest edition adopted by Authority Having Jurisdiction (AHJ)~~) **-2023 Edition**
- Green Building Act (20 ILCS 3130/1)
- Office of the State Fire Marshal Administrative Rules
- City of Chicago Building Code Sections – Connections to City of Chicago Utilities

11. The Masonry Society (TMS):

- a. TMS 402/602 Building Code Requirements and Specification for Masonry Structures

Thermal and Moisture Criteria

1. All components of the exterior envelope to be sealed and weather tight in a manner that allows for thermal expansion and building movement.
2. Aluminum framed mullions to be thermally broken.
3. Provide thermal breaks at locations where structural members project through the building thermal envelope.
4. Provide continuous insulation.
 - a. Offset linear elements supporting opaque cladding from the structure with attachments that allow the continuous insulation to pass behind the cladding support element except at the point of attachment.
 - b. Extend continuous insulation up both sides of parapet walls not less than 2 feet above the roof covering or to the top of the parapet, whichever is less.
5. Maintain a continuous vapor barrier that prevents either interior air or exterior air from condensing within the exterior wall assembly.
6. Air leakage performance to comply with Building Envelope Requirements listed in the OPR.
7. Overhead loading dock doors shall be equipped with weather seals that restrict air leakage and provide direct contact along the top and sides of vehicles that are parked in the doorway.
8. Thermal Performance of exterior envelope components and assemblies:
 - a. U-values for exterior wall, roof, and glazing assemblies to comply with Building Envelope Requirements listed in the OPR.
 - b. U-value of mass floors shall not exceed ~~0.53~~ **0.57**; U-value of joist/framing floors shall not exceed 0.033.
 - c. C-factor of walls below grade shall not exceed ~~0.092~~ **0.119**.
 - d. F-factor of unheated slab-on-grade floors shall not exceed 0.52.
 - e. U-value of overhead garage doors shall not exceed 0.31.
 - f. U-value of opaque swinging doors shall not exceed 0.37.

3. Provide wind dispersion analysis of the local environment (CFD and/or Wind Tunnel) to verify no re-entrainment potential or impact to adjacent building air intakes.

Envelope commissioning

Farnsworth Group is the designated Commissioning Authority (CxA) who will be responsible for the Building Enclosure Commissioning. The Design Build Team will be required to collaborate with the CxA during the design and construction process. Refer to the Owner's Project Requirements in Section 13.9 and the Commissioning Plan in Section 13.3 for Envelope Commissioning requirements and responsibilities.

Air Leakage Testing

The building envelope air tightness will be tested by a third-party consultant reporting to the Owner's Commissioning Authority for compliance with the thresholds identified in Section C402.6.2 of the ~~2026~~ **2023** Illinois Stretch Energy Code. The anticipated testing protocol is ASTM E779 (Standard Test Method for Determining Air Leakage Rate by Fan Pressurization). In the event the required performance is not achieved following the execution of the testing protocol, the Design Builder will be responsible for the costs to remediate, retest, and document compliance with Exception 1 under section C402.6.2.

Mockups

Build mockups of the exterior envelope as called for in *UIC Building Standards*, including but not limited to masonry, air barriers, waterproofing, storefront and curtainwall assemblies, to do the following:

- Verify material and color selections made.
- Demonstrate aesthetic effects, the quality of products, and the quality of workmanship.
- Demonstrate acceptable coordination between components and systems
- Perform preconstruction testing.

8.2 MECHANICAL SYSTEMS

APPLICABLE CODES AND STANDARDS

1. International Building Code (IBC) – 2024 Edition
2. International Existing Building Code (IEBC) – 2024 Edition
3. International Fire Code (IFC) – 2024 Edition
4. International Property Maintenance Code (IPMC) – 2024 Edition
5. International Mechanical Code – 2024 Edition
6. National Electrical Code NFPA 70 – NEC Current Edition
7. Illinois Elevator Safety and Regulation Act – ASME A17.1 2019
8. Green Building Act (20 ILCS 3130/1)
9. Illinois Stretch Energy Code – ~~latest adopted by Authority Having Jurisdiction (AHJ)~~ **2023 Edition**
10. Office of the State Fire Marshal Administrative Rules
11. City of Chicago Building code sections – Connections to City of Chicago Utilities
12. UIC Building Standards
13. ASHRAE Standard 62.1: Ventilation for Acceptable Indoor Air Quality
14. ASHRAE Standard 90.1 – 2022: Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings
15. ASHRAE Standard 170: Ventilation of Health Care Facilities
16. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems
17. NFPA 30 - Flammable and Combustible Liquids Code
18. NFPA 54 - National Fuel Gas Code
19. ACGIH Industrial Ventilation - A Manual of Recommended Practice
20. ANSI/AIHA Z9.5-2012 - Laboratory Ventilation Standard
21. OSHA 29 CFR Part 1910 - Occupational Exposures to Hazardous Chemicals in Laboratories
22. ASHRAE Standard 110-2016 - Method of Testing Performance of Laboratory Fume Hoods
23. Biosafety in Microbiological and Biomedical Laboratories, Fifth Edition
24. United States Pharmacopeia (USP) 797-2019
25. United States Pharmacopeia (USP) 800-2016
26. University of Illinois at Chicago Campus Standards
27. Illinois Department of Public Health (IDPH)

TERMINAL DESIGN CRITERIA

System	Design Temperature ⁽ⁱ⁾ (°F)	Differential Temperature ⁽ⁱ⁾ (°F)
Cooling Coils	<u>45⁽ⁱⁱ⁾</u>	16
Chilled Beams	58	6
Preheat Coils	130 ⁽ⁱⁱⁱ⁾	20
Reheat Coils	130 ⁽ⁱⁱⁱ⁾	20
Perimeter/Supplemental Heat	130 ⁽ⁱⁱⁱ⁾	20
Humidifiers	240 (10 PSIG Saturated)	N/A
Lab AHU Supply Air	55 ^(iv)	N/A
Vivarium AHU Supply Air	55 ^(iv)	N/A

- i. Refers to circulated fluid temperature unless otherwise indicated.
- ii. **The design build team shall evaluate supply water temperature to achieve the required cooling and dehumidification needs of the systems. The systems decoupled by the heat exchangers will operate at a higher temperature than the campus chilled water temperature.**
- iii. These temperatures allow conversion to condensing boilers in the future without requiring modifications to distributed equipment.
- iv. The low discharge air temperature intended to provide humidity control for summertime laboratory conditions (72°F dry-bulb/ 50% relative humidity maximum)

8.5 ELECTRICAL & FIRE ALARM SYSTEMS

APPLICABLE CODES AND STANDARDS

1. International Building Code (IBC) – 2024 Edition (excluding Chapter 11; compliance with Illinois Accessibility Code (IAC) – 2018 Edition.
2. International Existing Building Code (IEBC) – 2024
3. International Fire Code (IFC) – 2024 Edition
4. Illinois Stretch Energy Code – ~~latest adopted by Authority Having Jurisdiction (AHJ)~~ **2023 Edition**
5. National Electrical Code NFPA 70 – NEC 2026
6. NFPA 72: National Fire Alarm and Signaling Code – Current Edition
7. Illinois Elevator Safety and Regulation Act- ASME A17.1 2019
8. Illinois Environmental Barriers Act (IEBA) 2017 Edition
9. Illinois Accessibility Code 2018 – IAC
10. Green Building Act (20 ILCS 3130/1)
11. Office of the State Fire Marshal Administrative Rules
12. City of Chicago Building code sections – Connections to City of Chicago utilities
13. UIC Building Standards

ELECTRICAL SYSTEMS - OVERVIEW

Electrical systems for the University of Illinois (UIC) Drug Discovery and Cancer Research Pavilion include a normal branch, a critical research branch, and an emergency life-safety branch. UIC Office of Capital Planning Building Standards will be followed to augment electrical system design requirements.

Notable features include:

- a. Two separate 12.47kV primary utility feeders will feed to a new electrical substation vault within the basement level of the new building. Two 3750kVA pad (or utility vault) mount transformers will step voltage down to 480/277V and feed each end of a 4000-amp main-tie-main switchboard (MTM) with automatic transfer operation in the event of a power failure. The main–tie–main configuration shall include an Automatic Throw-Over (ATO) PLC with capabilities for closed-transition source-to-source testing. Surge protection shall be provided at the main switchboard. (see surge protection section below).

- b. If improved Energy Code Compliance cannot be achieved (as described above), a Solar Photovoltaic System shall be sized for a minimum production of not less than 0.75W/sf multiplied by the sum of the gross conditioned floor area of all floors, not to exceed the combined gross conditioned floor area of the three largest floors. (applicable energy conservation code Section C405.15.1; Climate Zone 5A; 141,050 sq-ft based on the electrical load calculation for all program spaces)

The solar PV system shall be comprised of PV modules, Inverters, DC combiner boxes, disconnects, AC distribution panels, grounding, PV roof structural supports ballasts, monitoring/metering communication equipment, all AV and DC wiring in conduit.

Inverter Requirements

- a. **Shall support open protocol communication (Modbus TCP minimum)**
- b. **Shall support SunSpec protocol**
- c. **Shall allow local data access without cloud dependency**
- d. **Shall be compatible with BACnet integration via gateway or native**
- e. **Shall not require proprietary cloud-only monitoring platforms**
- f. **Inverter warranty shall be minimum 10 years, extendable to 20 years.**

Design Criteria

The Solar PV System to comply with requirements of **Illinois Stretch Energy Code**, NFPA 70, Article 690 and NEC 705 for grid connection.

System Description – Battery Energy Storage System

Provide a permanently installed Battery Energy Storage System (BESS) including all inverters, converters, disconnects, conduit and wiring sized for a minimum production of not less than 100% of the installed on-site renewable electric energy (roof solar photovoltaic system) rated power (kWDC). Electrical storage devices shall have minimum capacity of 1.5 watt-hours per sq-ft of gross building area (applicable energy conservation code Section C406.3.5 G04 & Appendix CJ101.1.1). This system to be provided as required per the EOR's analysis of the anticipated total building energy load consumption to offset such building load for resiliency and peak load shaving to comply with the energy code. The BESS system to have a capacity range between 100 kW minimum to 300 kW maximum and a kilowatt-hour rating of 200 kWh to 600 kWh and sized to offset approximately 50% of the total building load for about 2.5 hours.

The BESS System to comply with requirements of Illinois Stretch Energy Code, NFPA 70, Article 705, 706, 480 and UL 9540. The BESS system shall be interfaced with the solar PV system and shall be located outside on a 6" thick reinforced concrete pad.

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ENERGY MONITORING SYSTEM

System Description

Provide an Electrical Energy Monitoring System to monitor the following load categories:

- 1. Total electrical energy
- 2. Interior lighting
- 3. Exterior lighting
- 4. HVAC systems (heating, cooling, fans, pumps, boilers)
- 5. Service water heating systems
- 6. Receptacle/plug loads
- 7. EV charging
- 8. Total energy usage >10%. (any comingled loads)

Design Criteria

Provide software integration for all electrical sub-metering to totalize use, to record demand, and to store data over a 36-month period. This software integration protocol shall be provided for both local and web-based monitoring. To meet the advanced energy metering requirements, power meters shall possess the following qualities and capabilities:

- 1. Data Reporting & Communication: Systems must be capable of automatically communicating data to a centralized data acquisition system, providing graphical reports.
- 2. Monitoring Methods: Meters, sensors, or Non-intrusive Load Monitoring (NILM) packages can be used. Current sensors must have a ±2% accuracy.
- 3. The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.
- 4. The system must be capable of storing all meter data for at least 36 months.
- 5. The data must be remotely accessible.
- 6. All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

<u>Acceptable Manufacturers (cont.)</u>	
<u>Renewable Energy Systems – Solar Panels</u>	<u>LONGi, Trina Solar, Canadian Solar and JA Solar</u>
<u>Renewable Energy Systems – Microinverters</u>	<u>SMA Solar Technology (Preferred), ABB / Hitachi Energy, Schneider Electric (Conext / EcoStruxure), Fronius</u>

General Requirements

1. Equipment from listed manufacturers shall be standard production models, not prototypes.
2. Substitutions must include performance data, maintenance documentation, and proof of BAS compatibility.
3. All equipment shall comply with UIC Building Standards and BAS Integration Guidelines.
4. Final acceptance of alternatives is at the discretion of CDB & UIC PSPM and may require testing.
5. Maintain consistency across campus for parts and service.

13.9 OWNER'S PROJECT REQUIREMENTS



Owner's Project Requirements

UIC Drug Discovery and Cancer Research Pavilion

University of Illinois Chicago
Illinois Capital Development Board

CDB Project 830-030-167

Date: 9/21/2026

Version: 1.4

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PURPOSE AND INTENT

The purpose of this Owner’s Project Requirements (OPR) is to clearly document the design, performance, and operational goals expected to be met by the Drug Discovery & Cancer Research Pavilion (DDCRP). The OPR establishes the baseline for design, construction, and commissioning and serves as the primary reference for evaluating and verifying building performance throughout the project lifecycle. As a living document, it may be updated as project decisions evolve and as additional information becomes available.

The OPR includes requirements that are more stringent than the general UIC Building Standards due to the specialized nature of research and laboratory functions within the DDCRP. Where conflicts arise, the OPR shall take precedence over campus building standards unless specifically approved otherwise by UIC. The UIC Building Standards remain the baseline framework, but the OPR defines enhanced expectations for performance, safety, reliability, and system integration.

The design team will develop a Basis of Design (BOD) document in direct response to the OPR. The BOD describes how the proposed building systems meet the Owner’s requirements, outlines design intent and assumptions, and shall be updated at each design submission to confirm alignment between the OPR and the design solution.

Hierarchy of Project Requirements

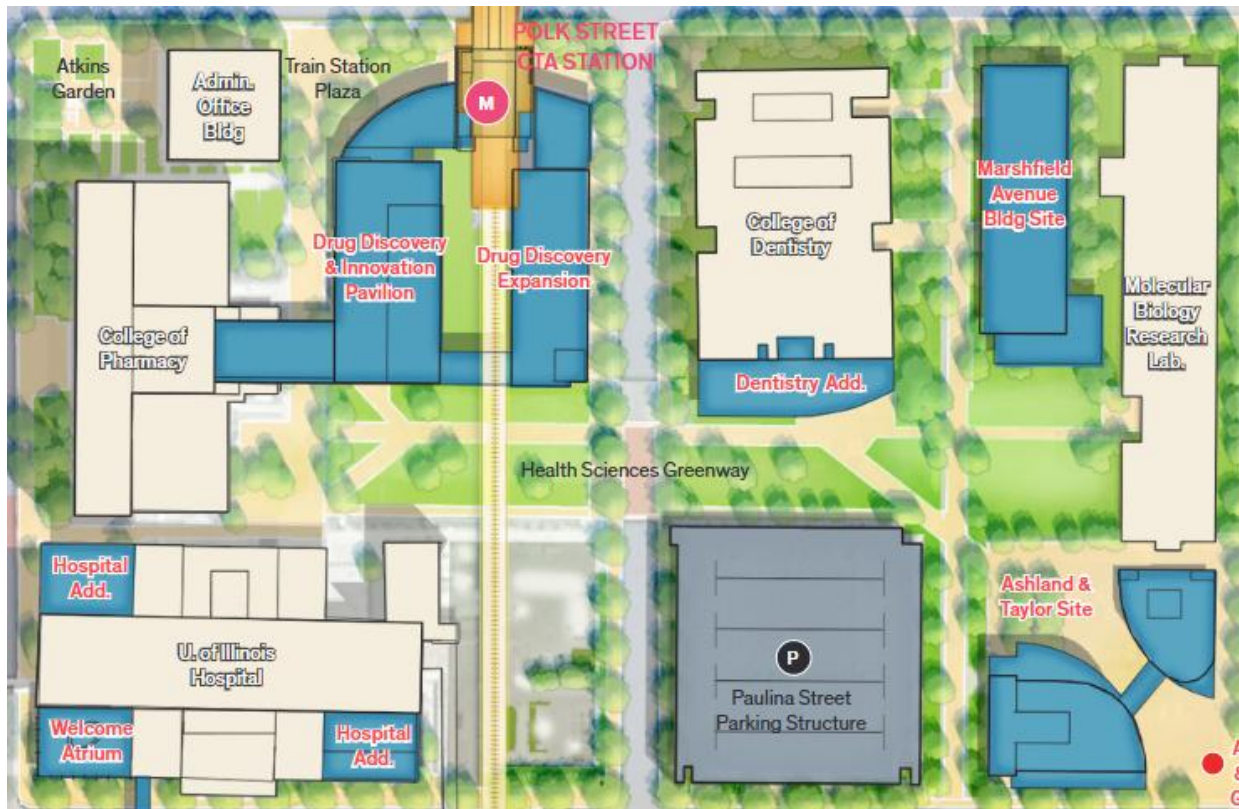
1. Code requirements and AHJ directives
2. Owner’s Project Requirements (OPR)
3. UIC Building Standards
4. Basis of Design (BOD)
5. Contract Documents (Drawings & Specifications)

Any conflict shall be resolved in the order listed above.

Table 1: Summary of OPR Revisions

Version:	Date:	Revision Notes
0.9	11/20/25	Initial OPR Prepared
1.0	01/30/26	OPR Revision 1
1.1	03/12/26	Aligned with Bridging Team Comments
1.2	03/27/26	Aligned with 2026 Stretch Energy Code Requirements
<u>1.3</u>	<u>05/29/26</u>	<u>Aligned with Bridging Documents and Building Envelope Testing Discussion</u>
<u>1.3.1</u>	<u>07/07/26</u>	<u>Administrative revision – corrected date and formatting</u>
<u>1.4</u>	<u>09/21/26</u>	<u>Aligned with 2023 Stretch Energy Code Requirements</u>

PROJECT OVERVIEW



Background

The DDCRP provides advanced laboratories, vivarium facilities, core research spaces, and offices to support interdisciplinary collaboration in drug discovery and cancer research. The project consolidates research groups and aligns with UIC's mission to promote translational biomedical innovation.

Key Drivers:

1. Flexible, modular laboratory design
2. High energy and water efficiency
3. Resilient and redundant systems
4. Enhanced indoor environmental quality
5. Integration with campus utilities and BAS systems
6. Design & Performance Goals

Key Goals:

The Design-Build Team shall develop the project to achieve a predicted whole-building Energy Use Intensity (EUI) not exceeding 290 kBtu/sf-yr. The CDB/UIC LEED target performance is 250 kBtu/sf-yr or less (ASHRAE 90.1-2010 Appendix-G), with an aspirational stretch goal of 180 kBtu/sf-yr or lower following Illinois Energy Conservation Code 2024 methodology for state funded facilities.

1. Maintain lab temperature 72°F ±2°F, 45–55% RH
2. Maintain CO₂ < 800 ppm (occupied)
3. Achieve LEED Gold certification

Key Project Requirements

There are a number of imperatives and objectives that will be met through the construction of a new DDCRP building, including the ability to:

- Create a research and instructional experience that supports the mission and vision of the school and department
- Enhance the department's identity and ability to expand its current reputation as a top program
- Meet UIC Building Standards and applicable codes.
- Address growing need for funded research space
- Build state-of-the-art facilities and equipment.
- Provide N+1 redundancy for critical HVAC/power/vivarium systems.
- Integrate flexible infrastructure to accommodate evolving technologies
- Ensure flexibility for future program changes.
- Enhance distance learning and other supporting technologies
- Free up previously used spaces within the existing building for other uses
- Ability to host symposiums and featured speakers

Code requirements and building standards

The project will be designed in accordance with all applicable Codes, Standards and Authorities having jurisdiction, the Underwriter's Laboratory and in accordance with current engineering practices.

The project will also comply with the most current UIC building design and construction standards **at the time of submission**. Standards are located via <https://pspm.uic.edu/codes-and-standards/>

~~This project will also comply with the most current Illinois Stretch Energy Code as a State Funded Facility, per 20 ILCS 3125.~~

This project will comply with **the 2023 Illinois Stretch Energy Code** as a State Funded Facility, per 20 ILCS 3125.

The construction documents shall include additional electrical infrastructure as may be required for state electrification readiness requirements.

Occupancy Requirements

The primary purpose of the DDCRP will be for the use of students and faculty. The functional use common to most user groups include:

- Lobby – Welcome space as the new entrance to the research buildings.

- Specialty Spaces – Include spaces for offices, computer lab, instructional spaces and staff lounges.
- Conference / Seminar rooms - Adequate meeting space for the various groups is required for efficiency of activities and to simplify scheduling issues.
- Storage space - Lockable storage space is a necessity for each individual and each group within the building.
- Corridors – Corridors on each floor provide efficient movement throughout the building and between the building user areas. The corridors should be designed to prevent blind corners and collisions and be wide enough equipment to pass.
- Public restrooms – Public restrooms are needed for use by any building occupant or visitor. The restrooms must be conveniently located, clearly marked, and accessible.
- Phased design approach to support expansion
- Custodial space – Closets or other designated custodial areas are needed on each floor to allow the janitorial staff to efficiently perform their duties without interruptions or inconveniences to other building staff.
- Mechanical rooms – Space must be designated within the building to allow for installation of mechanical equipment. This space should be optimally located to allow the simplest and most efficient mechanical design.
- Electrical/communications space –Building must contain adequate space for installation of electrical and communications equipment. These spaces must be coordinated with the Communications department to ensure that all user technology and utility needs are met.
- Building Occupancy Periods: All areas unless otherwise noted shall be designed for the following occupancy:
 - 24x7 for labs and vivarium; standard business hours for offices.
 - Peak expected building occupancy: approximately TBD people.

Laboratory Design Principles

- Safety and containment take precedence over aesthetics or architectural convenience.
- Maintainability and service access shall override architectural concealment.
- Laboratory HVAC systems shall remain physically and functionally independent from office systems.
- No design shall reduce lab exhaust or lab pressurization stability for energy savings.
- All laboratory environments shall allow future reconfiguration without major demolition.

Building Lifecycle, Adaptability, and Future Expansion

- The proposed facility's life expectancy should be at least 60 years. As this exceeds the typical expectancy of many building systems, accommodation should be made for replacement and renewal.

- The facility should be designed to allow for future expansion and adaptation. Things to be considered include: Building Layout, Electrical and Telecom capacity, Mechanical system capacity or expandability

SUSTAINABILITY REQUIREMENTS

The project shall achieve LEED v4 Gold Certification through building and site design, without reliance on owner policy or purchases. A LEED strategy shall be developed with adequate contingency. The Design-Build Team shall be required to provide all LEED submittals, calculations and supporting documentation to obtain LEED Gold Certification. Detailed LEED requirements are found in Appendix B.

The Integrative Design Process starts in pre-design and continues throughout the design process, with outcomes documented in the OPR/BOD. It must adhere to the Capital Development Board's Design-Build requirements, and align with UIC Climate Commitments; implement energy/water efficiency and low-toxicity materials strategies. Refer to building standards [01 81 13 Sustainable Design and LEED Standards](#)

The design shall prioritize passive energy reduction through building massing, envelope, and fenestration to reduce equipment capital cost and spatial requirements. It shall incorporate energy recovery as to further reduce energy demand and consumption.

Metering

Provide submeters for:

- a. Chilled water
- b. Heating hot water
- c. Steam
- d. Electrical loads
- e. Domestic water
- f. RO/DI systems
- g. Renewable Energy

Envelope Commissioning

Building envelope testing to be performed shall be specified by the Design-Build team in direct consultation with Commissioning Professional, subject to final review and approval by CDB. The building enclosure testing scope shall be managed by the Commissioning Professional who shall develop and maintain a building enclosure testing matrix as part of the Commissioning Plan. This matrix will be in a format appropriate to provide potential testing agencies guidance for scoping purposes and coordination with the Design-Build Team. See building envelope section for more details. Testing scope will include the following at a minimum:

- a. Mock-up testing.
- b. Below grade water proofing
- c. Below slab vapor barrier
- d. Exterior walls and joints
- e. Storefront and Curtainwall Window Systems
- f. Roofing Systems
- g. Air Barrier testing via Blower door / compartmentalized

Monitoring-Based Commissioning (MBCx)

Monitoring-based commissioning will be established and ongoing to verify system operations align with energy performance and indoor environmental quality targets. MBCx will include the following:

- a. BAS must export trend data for continuous analytics and fault detection.

LIFE CYCLE COST ANALYSIS

Life cycle cost analysis (LCCA) should be used as a supportive tool in design decisions, alongside professional engineering knowledge and judgment. LCCA is valuable for comparing the long-term ownership costs of two or more equally feasible design options, and its results should be considered as important inputs in the decision-making process.

That said, LCCA must not be the sole basis for selecting a design. The ultimate responsibility lies with the expertise of the design professional—or ideally, a team of professionals—who can weigh both numerical and non-numerical factors. LCCA results are only as reliable as the assumptions behind them, which may be uncertain or subjective (e.g., future energy prices).

Some critical factors cannot be quantified, such as system reliability or the consequences of equipment downtime. While installed cost is small compared to lifetime operating cost, it is often overlooked that operating cost itself is outweighed by performance outcomes like occupant productivity and research quality. These outcomes cannot be easily expressed in numbers, but their value is significant and must be given appropriate weight in the decision process.

DESIGN & PERFORMANCE GOALS

MECHANICAL SYSTEMS

VENTILATION REQUIREMENTS

- a. All HVAC systems must provide mechanical ventilation in compliance with: International Mechanical Code (IMC), ASHRAE Standard 62.1, and Campus Building Standards.
- b. All air handling units (AHUs) shall be fan wall or fan array per campus building standards 23 73 23.
- c. No AHU/DOAS/RTU shall have factory-provided package controls. All temperature control shall be field-installed per 23 09 23 & 25 00 00.
- d. Natural ventilation is not allowed.
- e. Access from the building interior to roof mounted air handling equipment must be adequate to facilitate anticipated maintenance and repair activities. Full size interior or exterior stairs are required to satisfy this requirement. Ladders, platforms, and walkways are to be provided as required to provide safe and convenient transport to roof-mounted equipment access points. Provide requirements for transport of boxed air filters given and other difficult-to-handle or bulky items.
- f. Air handling units in variable air volume (VAV) systems are to use of air blending devices located within air handling units and/or mixed air plenums. The length of airflow downstream of the device is to be greater than the manufacturer's published minimum.
- g. All ductworks shall be ducted. No plenum returns are permitted anywhere within the building, regardless of occupancy type.
- h. All Lab exhaust shall be stainless steel ductwork.
- i. Air handling unit: The air handling unit(s) shall be variable air volume, medium pressure unit(s) with direct drive supply and return fan arrays with premium efficiency motors and each fan controlled by a dedicated variable frequency drive, economizer Section, mixing box, filter Section with 30% (MERV 8) pre-filters and 85% (MERV 13) final filters, hot water preheat coil with circulating pump(s), and chilled water cooling/ dehumidification coil. Outside air, relief air, return air and supply air streams shall be equipped with air flow measuring stations. Electronically Commutated Motors (ECMs) are not acceptable.
- j. Humidification shall be provided centrally at the AHU level or in mechanical rooms. In-space or ceiling-mounted local humidifiers are not permitted unless specifically approved by UIC. Vivarium applications may be excepted where required by final design and approved by UIC. Humidifier valves and appurtenances shall be located for safe service access
- k. Return air shall volumetrically track supply air and relief air shall volumetrically track outside air to maintain a slight positive building pressure. All air handling unit systems shall be provided with 100% outside air economizer cycles for free cooling. All outside air shall be preconditioned through the use of a heat recovery device so as to capture and reuse waste heat. Variable air volume type air handling units shall distribute supply air (55°F) to room terminal control units through a medium pressure round/flat oval duct system. Each zone shall be provided with a

room terminal control unit for independent space temperature control. The terminal control units shall be equipped with hot water heating coil.

- l. Individual terminal units with ducted supply and return air system to ceiling supply air diffusers shall be provided for each room. These units shall be selected to maintain the desired indoor temperature conditions. All air-moving equipment and ductwork shall be installed in accordance with requirements of SMACNA and ASHRAE.
- m. Exhaust fans shall provide code required exhaust and general exhaust for restrooms, locker rooms, garage ventilation, mechanical rooms, and kitchen. The makeup air for the exhaust shall be provided by building air handling unit.
 - a. Default fume hood diversity assumed 85%, confirm final design with UIC requirements.

The design professional shall specify the qualifications and procedures required for a completely balanced system. The test and balance contractor shall be managed by a Professional Services Consultant not affiliated with the Design-Build Team

THERMAL ZONING

- a. Each occupied space must be a separate zone for temperature/airflow control.
- b. Minimum one terminal air-side control unit per occupied space (e.g., vav with reheat).
- c. Exterior zones require a separate heat source sized to offset envelope losses.
- d. Each occupied space must have at least one thermostat.
- e. Public/assembly spaces (lobbies, atria, receptions) count as occupied zones

HYDRONIC SYSTEMS

- a. Use central non-potable water-based systems for heating/cooling.
- b. **Design to consider independent hot water heating loops based on temperature, demand and efficiency requirements such as:**
 - a. **Reheat coils (year-round service)**
 - b. **Preheat (glycol, seasonal)**
 - c. **Perimeter heating (water, seasonal)**
- c. Include heat exchangers, **N+1** pumps, expansion tank, air/dirt separator, bypass filter.
- d. 100% redundancy for critical hydronic equipment (chillers, boilers, hx, pumps).
- e. Perimeter/preheat loop: 30% ethylene glycol.
- f. Reverse return preferred; direct return acceptable with oversized mains/risers.
- g. Avoid balancing valves at terminal devices (reduces valve authority).
- h. Use venturi devices with test plugs for diagnostics.
- i. Provide balancing valves for parallel devices (e.g., stacked AHU coils). Not required with pressure-independent control valves.
- j. Belimo Energy Valves for pressure-independent control preferred
- k. Minimum flow rate: 30% to protect boilers, chillers, pumps, and VFDs.
- l. Air Handling Unit Fans shall be selected and controlled to operate outside of surge conditions including fan failure modes.
- m. Preheat coils require a dedicated pump and bypass loop for constant flow.

- n. VFD pumps controlled by DP sensors at a hydraulically remote point (may need multiple transmitters).
- o. Static pressure monitoring at the highest return main point.
- p. Standalone zoning for vestibules and similar heated spaces.
- q. Pump requirements: ≤ 2 hp inline, ≥ 3 hp base-mounted, > 6 in. Inlet double-suction split case.
- r. Only quarter-turn ball or butterfly valves (globe valves only for throttling).
- s. Provide isolation valves at each equipment and branch line (with vents/drains at floors).
- t. Provide in-line coalescing air/dirt separator with blowdown to bypass bag filter.
- u. No pump over-speeding; must operate at 60 hz rated speed.

CHILLED WATER SYSTEM

- a. Buildings near the campus chilled water system must connect to it (new and renovation projects).
- b. Systems must be compatible with campus distribution.
- c. Heat exchangers required to isolate central system from equipment with hoses/quick connects.
- d. Not required for AHU coils, FCUs, and small room coolers.
- e. Microchannel condenser chillers must not connect directly.
- f. Spaces needing 24/7 cooling must have dedicated units (preferably central CHW).
- g. Includes: elevator rooms, mechanical equipment rooms, electrical rooms, server rooms, a/v rooms.
- h. CHW coils must be designed for 46°F entering / 62°F leaving water temps, 16°F Δt maintained.
- i. PTACs and packaged AC are disallowed unless approved by PSPM.
- j. DX systems not allowed if the CHW system is available and expandable.

ACOUSTICAL REQUIREMENTS

Design to control noise generated from the HVAC system, including central systems, ductwork, unitary units, and room air distribution, which may create an environmental distraction to the occupants.

- a. Provide speech privacy
- b. Control HVAC noise in occupied spaces
- c. Control noise at the HVAC equipment rooms
- d. Control noise for major outdoor HVAC equipment
- e. Target Interior Noise Levels
 - i. Labs- NC 35-40
 - ii. Offices: NC 30-35
 - iii. Conference Rooms: NC 25-30
 - iv. Mechanical Rooms: NC 45-55
- f. **Control noise to levels as indicated above including perimeter areas facing train station where outdoor levels can exceed 90dB with ambient levels around 65dB. See acoustical testing report in bridging document appendix for more detail.**

BACKUP EQUIPMENT (N+1 OR DUPLEX)

- a. Steam/HW heat exchangers (independent systems or single combined systems).
- b. Hydronic and steam condensate pumps.
- c. Hazardous fume exhaust fans.
- d. HVAC for critical laboratory equipment.
- e. HVAC for research animals.
- f. HVAC for data centers.
- g. Lab air compressor system (N+2)

DISALLOWED EQUIPMENT (WITHOUT VARIANCE)

- a. Window air conditioning units.
- b. Packaged terminal air conditioners (PTACs).
- c. Dx split systems (without PSPM approval).
- d. VRF systems.
- e. Commercial rooftop packaged units.
- f. Packaged HVAC with factory controls.
- g. Fin tube heating (without PSPM approval).
- h. Fan-powered boxes, blower coils.
- i. Two-pipe combination heating/cooling systems.
- j. Belt-driven systems

ELECTRICAL SYSTEMS

- a. The electrical distribution system shall be 480/277 volt, three phase, four wire from the main switchboard to panelboards throughout the building. The main switchboards will contain molded case, electronic-trip circuit breakers and Owner-metering equipment, as well as ground fault protection on the main circuit breakers and surge suppression devices.
- b. Dry type transformers shall be provided to supply 208/120 volt, three phase, four wire service to panelboards throughout the building. Panelboards and transformers shall be installed locally throughout the building to minimize voltage drop on branch circuits.
- c. Provide a standalone emergency generator with Automatic Transfer Switch (ATS) equipment.
- d. Generator shall be sized at 125% of calculated peak emergency load with minimum 20% future capacity..
- e. All ATS units shall be capable of closed-transition and bypass-isolation type, allowing safe maintenance, testing, and service without loss of power to emergency circuits or critical loads.
- f. The main-tie-main (MTM) switchgear configuration shall include an Automatic Throw-Over (ATO) PLC with capabilities for closed-transition source-to-source testing.
- g. All building grounding, including equipment grounding, shall utilize a Hogan ground system to ensure uniform grounding resistance and compliance with UIC electrical safety standards.
- h. No conduits shall be encased in concrete in slabs, decks, or structural elements.

- i. Mineral-insulated (MI) cable shall not be used anywhere on the project.
- j. Electrical panels serving loads intended for energy monitoring shall be dedicated to a single end-use category to the greatest extent possible (e.g. lighting, receptacles, HVAC, process, plug, etc.) Where mixed loads are unavoidable, sub-metering or branch-circuit metering shall be provided.

LIGHTING SYSTEMS

General lighting and mechanical equipment shall be served at 480/277 volts and receptacles and office equipment shall be served at 208/120 volts.

Requirements:

- a. The electrical systems shall incorporate energy efficient options.
- b. A central lighting control system will be provided for lighting throughout the building.
- c. Lighting shall be LED throughout.
- d. Automatic controls consisting of vacancy and/or occupancy sensors shall be utilized to the maximum extent possible.
- e. Reduce the overall LPD of the building by 30% under ASHRAE 90.1-2012
- f. Lighting- controls should meet the requirements of ASHRAE 90.1-2012 and include daylight controls near windows and vacancy or occupancy sensors for at least 75% of the connected load.
- g. Multi-occupant spaces should have individual, dimmable lighting controls, including conference rooms and flex space programs.
- h. Daylighting is an important element and Interior walls are composed of large areas of glass to enable daylight to penetrate into the building core.
- i. The lighting systems will need to be well balanced in order to respond to the goals of including high levels of daylight to ensure that spaces feel inviting and comfortable and to meet the needs of occupants.
- j. Emergency lighting shall be provided throughout the building for all emergency egress paths and in public rooms and exhibit processing and storage areas. Emergency lighting circuits shall be connected to the on-site emergency generator power system.
- k. Automatic lighting shutoff shall not be installed in electrical rooms, mechanical rooms, or elevator machine rooms. Automatic lighting shutoff shall not be installed in laboratories or workshops if automatic shutoff would endanger the safety or security of the room or building occupants. Automatic lighting shutoff shall not be installed in other spaces where automatic shutoff would endanger the safety or security of the room or building occupants. A list of all spaces being exempted from automatic lighting shutoff based on safety and security concerns shall be submitted and reviewed with the University during project design.
- l. Power Distribution Acceptance Tests to include NETA testing per UIC Standards 26 08 12 Power Distribution Acceptance Testing, including:
 - a. 600V and MV Cables, including thermographic survey and insulation resistance test
 - b. MV distribution and protective relays
 - c. Electrical Metering

- d. Generator(s) including insulation resistance testing per IEEE Standard 43 and vibration baseline test
- e. Small, dry type transformers including thermographic survey and insulation resistance testing
- f. Large, dry type transformers, including thermographic survey, insulation resistance, winding resistance, power factor dissipation, turns-ratio, and excitation current tests
- g. Low-Voltage Switchgear and Switchboard Assemblies, including instrument, control, and potential transformers, thermographic survey, control wiring insulation resistance, bus joint and insulation resistance, over potential, and primary current injection testing
- h. Low Voltage Circuit breakers, including thermographic survey, contact resistance, insulation resistance, and primary injection testing
- i. ATS, including thermographic survey, contact resistance, and insulation resistance testing
- j. Motor Control Center, including bus joint and insulation resistance and control wiring insulation resistance
- m. Ground Fault Protection Systems and Grounding Systems

RENEWABLE ENERGY SYSTEMS

~~Photovoltaics and any required energy storage systems to be provided per requirements of most current Illinois Stretch Energy Code.~~

Photovoltaics and any energy storage system design requirements to be provided per the 2023 Illinois Stretch Energy Code as adopted by this project.

Inverter Requirements:

- a. Shall support open protocol communication (Modbus TCP minimum)
- b. Shall support SunSpec protocol
- c. Shall allow local data access without cloud dependency
- d. Shall be compatible with BACnet integration via gateway or native
- e. Shall not require proprietary cloud-only monitoring platforms
- f. Inverter warranty shall be minimum 10 years, extendable to 20 years.
- g. **See approved manufacturer list in bridging document appendix**

PLUMBING SYSTEMS

A complete system of plumbing shall be provided throughout the building to comply with the requirements set forth in the program and installed in strict accordance with all applicable codes.

Requirements:

- a. Lavatories shall be metered 0.5 GPM and have exposed hard-wired sensors.
- b. Urinals shall be 0.125 GPF
- c. Water Closets shall be 1.28 GPF

- d. Single handle sink shall be 1.5 GPM
- e. The facility shall include a central laboratory air compressor system designed with N+3 redundancy to ensure continuous operation for research activities.
- f. Oil-less compressor technology only
- g. Dryers, tanks, and distribution designed per laboratory process requirements
- h. Monitoring and alarm integration with BAS
- i. Isolation valves and bypasses for equipment service
- j. Provide a centralized Reverse Osmosis (RO) + Deionized (DI) water system serving laboratory and vivarium functions.
- k. RO skid, storage tanks, distribution pumps, and polishing DI modules
- l. Loop circulation to maintain water quality and prevent stagnation
- m. Redundancy for critical components (pumps, controls, filtration)
- n. Conductivity monitoring and BAS integration for alarm conditions
- o. Floor drains and containment for equipment areas

FIRE SUPPRESSION SYSTEMS

The building shall have a full sprinkler system. The fire protection system design shall comply with the most current editions of all applicable NFPA standards and the Illinois State Fire Marshal requirements. The previous edition references (NFPA 13 2010, NFPA 14 2010, NFPA 20 2010, etc.) shall be updated to reflect the latest published editions at the time of design. System design shall be coordinated with the UIC Fire Marshal for confirmation of current standards and acceptance testing requirements.

Requirements:

- a. All materials and equipment must be FM approved and listed for use in fire protection systems.
- b. All wet system piping shall be black schedule 40 threaded.
- c. Drain piping shall be schedule 40 galvanized.
- d. New sprinklers shall be quick response type.
- e. All sprinklers shall be centered in both directions of acoustical tiles.
- f. All sprinklers within a compartment must be of the same type. Quick response and standard response sprinklers shall not be mixed within the same compartment.

FIRE ALARM SYSTEM

The fire alarm system shall comply with the authorities having jurisdiction.

- a. All fire alarm components shall include addressable field devices, and multiplexed, programmable, operator interface panels.
- b. Fire Command Center shall include fire alarm annunciator panel, one-way voice and two-way voice panels, elevator status panel, air handling status panel, emergency system status panel, fire pump and fire protection device status panel, stair door unlocking controls, detailed fire alarm drawings and zone map, etc. as required by the authority having jurisdiction.
- c. Notifier shall be the only approved fire alarm system manufacturer for this building.

- d. The fire alarm system shall include an Elevator Communication System Panel located at the building Fire Command Center, in accordance with the latest IBC and NFPA 72 requirements. This panel provides direct communication between elevators and emergency personnel and is now standard for all new UIC buildings. Coordinate equipment selection with UIC IT (Greg, Technology Solutions) to ensure consistency with the model used in recent buildings.

BUILDING AUTOMATION SYSTEM

The building automation and control system (BAS) also referred to as the building management system (BMS) shall be microprocessor controlled DDC with complete simultaneous monitoring and alarm capability. The systems' sensors and controllers shall be electronic. Each mechanical room or mechanical unit shall have standalone microprocessor based DDC monitoring, and field control panels with sufficient input/output to monitor and control required temperature, humidity, and flow. Field panels will be networked to a remote console personal computer to perform energy management, diagnostic and monitoring functions. The systems' sensors and controllers will be electronic. Actuators for valves and dampers will be electronically controlled. Room thermostats will be electronic. BAS system shall be fully BACnet compatible.

Requirements:

- a. The BAS shall comprise Tridium N4 JACE 9000 controllers integrated to a campus-wide Tridium N4 supervisor.
- b. Acceptable manufacturers for field-level controllers shall be Alerton and Distech with fully open BACnet License.
- c. The system integrators and contractors must be factory-direct, authorized, and trained by the system manufacturer to furnish, engineer, install, test, calibrate, and deploy this system.
- d. The DB team shall develop a full systems integration matrix listing all mechanical, electrical, plumbing, life-safety, metering, and specialty system points to be integrated with BAS. Matrix must be submitted at 50% and 100% CD.
- e. All Control Valves shall be Pressure Independent Characterized Control Valves (PICCV) at a minimum and shall be energy valves on all major mechanical equipment.
- f. Individual spaces should include occupancy sensors to reduce the energy consumption from lighting in the building.
- g. The building automation system shall reside on its own network and not rely on other IT infrastructure.
- h. Control to be based on BAS architecture consisting of communication network, user workstations, and modular designed DDCPs with all points addressable and modifiable from user workstations or from master DDCP user interface panels. BAS shall be fully stand-alone and shall communicate via BACnet communications protocol.
- i. The BAS shall be integrated to the UIC campus LAN/WAN via a non-firewalled network segment reserved solely for BAS systems by the University.

UTILITIES REQUIREMENT

The Design-Build Team shall coordinate all utility services with UIC Utilities & Energy Management. All new utility connections shall comply with campus standards, available capacity, and long-term maintainability expectations.

Requirements:

- a. All utilities, including but not limited to Steam, Chilled Water, and Electrical, shall be connected to campus utilities.
- b. None of the utilities shall be directly buried without prior approval from UIC utilities. The utility lines that enter the building shall be located in a walkable utility tunnel.
- c. Provide projected peak and diversified loads for all utilities during early design development.
- d. Provide dedicated, revenue-grade metering for the following systems per the campus standards:
 - a. Steam
 - i. The steam meter shall be sized to accurately measure 100% of the steam flow to the building, including both high and low use periods.
 - b. Chilled Water
 - i. The chilled water meter shall have matched pair RTD temperature sensors and Modbus RS-485 communications.
 - c. Electrical
 - d. Generator
 - e. Domestic Water
 - f. Natural Gas (if used)
- e. All new metering equipment shall include OEM factory start-up.
- f. For energy analysis, use utilities rates for FY26:
 - a. Electric – \$0.10115 /kwh
 - b. Steam- \$12.22386
 - c. Chilled Water-\$ 15.66487/MMBTU
 - d. Condensate- \$ 3.5671
 - e. These rates will be used for:
 - i. Energy Modeling (LEED, code compliance, performance evaluation)
 - ii. Life-Cycle Cost Analysis (LCCA)
 - iii. Utility cost comparison for system alternatives
 - iv. Carbon projections (if needed for CCAP24)
- f. UIC agrees to supply FY27 utility rates no later than the early design development phase after July 1, 2026.
- g. Provide site drainage, stormwater detention, and green infrastructure in compliance with MWRDGC and UIC standards. Confirm sewer capacity and backflow prevention requirements.
- h. Metering Systems Installation:
 - i. All utilities meters shall be tied directly into campus utilities portal utilizing a dedicated Tridium JACE. This JACE shall not be used for building automation systems.

- ii. All new metering systems shall be provided, wired and installed by the project controls contractor.
 - iii. UES personnel shall inspect and accept or reject all new revenue-grade metering systems.
 - iv. Integration of new meters to UES systems shall be provided by the UES-designated utilities system's integrator hired by the user agency.
- i. Electric Metering Systems
 - i. All new electric metering shall be revenue-grade.
 - ii. Metering shall be Electro Industries Shark 250 Meters with ethernet communications.
 - iii. Metering shall be capable of metering the entire site load including emergency feeds.
 - iv. New meters shall be stand-alone from any metering provided or integral to new gear.
 - v. New revenue grade current transformers shall be installed on new gear and sized for 80% of rated gear amperage.
 - vi. Electrical design shall allow for submetering and data access, as required to support LEED energy metering and advanced energy metering credits, including the ability to separately monitor major end uses and building systems.
- j. Steam Metering Systems.
 - i. Metering shall be Spirax Sarco ILVA with a Scanner 2000 flow transmitter. Scanner 2000 to include Modbus RS485 and 4-20ma output signals.
 - ii. Metering shall include temperature and pressure compensation
 - iii. Steam service shall include a parallel feed and necessary valves to allow for steam meter isolation without a steam shutdown for future service and maintenance.
 - iv. Steam meter shall be sized to meter 100% of the design rated flow
 - v. Steam service entrance to include straight runs of 10 pipe diameters upstream and downstream of installed meter location
 - vi. Prototypical drawing to be provided by UES.
- k. Condensate Metering Systems.
 - i. Metering shall be ABB Process Master Magflow inline flow meters with
 - ii. Metering shall also include a separate temperature and pressure sensor transmitters downstream of metering installation
 - iii. New flow meter shall include Modbus RS485 communications
 - iv. New metering shall be installed in a horizontal run in a U trap configuration with check valve upstream of the new flow meter. Prototypical drawing to be provided by UES.
 - v. Condensate pumps shall be automatic steam powered condensate pumps.
- l. Chilled Water Metering Systems
 - i. All new chilled water metering shall be Flexim F731 ultrasonic dual channel flow meter

- ii. Flexim transducers shall be mounted in stainless steel mounting tracks. One additional spare and empty set of mounting tracks to be installed and provided for future testing.

TECHNOLOGY SOLUTIONS

The design shall provide comprehensive network, communication, and emergency technology infrastructure supporting wired, wireless, and life-safety systems throughout the facility. All work shall comply with UIC Division 27 – Communications and current Technology Solutions (TS) standards.

Design & Coordination Requirements:

- a. Provide full Wi-Fi coverage; all layouts to be reviewed and approved by TS Wireless Engineering.
- b. Utilize Category 6A cabling for all wired network connections and provide underground ductbank to connect to Campus Node 1 at 1140 S. Paulina.
- c. Coordinate with TS (Tom Wiese) to determine the number and location of telecom rooms, risers, and pathways.
- d. Emergency Telephone Units (ETUs) shall be integrated into the network and include elevator phones, restroom ETUs, and exterior bollards; coordinate placement and programming with TS and UIC Public Safety.
- e. IT Hardware Procurement Responsibilities
 - a. Certain IT equipment must be User Agency-Furnished due to licensing and procurement restrictions.
 - i. Wireless Access Points: User Agency Furnished / Contractor Installed – purchased by TS, installed by contractor.
 - ii. Network Switches: User Agency Furnished / User Agency Installed – furnished and installed by TS.
 - iii. ETUs: User Agency Furnished; installed/programmed by TS.
- f. TS will perform hardware take-offs upon receipt of DD/CD drawings and develop the IT hardware budget using a project CFOP.
- g. Elevator Two-Way Visual Communication System
 - a. Provide a two-way visual and audio elevator emergency communication system equivalent to the RATH / AVIRE SmartView VAM system.
 - b. System shall be User Agency Furnished / Contractor Installed, and coordinated with TS (Greg Crnich – crn1@uic.edu).
 - c. This is a standardized system on campus and shall be considered a sole source item for compatibility with UIC's emergency communication infrastructure.

SECURITY & ACCESS CONTROL

- a. Provide UIC-standard access control hardware compatible with Lenel (current) and Genetec (future) platforms; final platform selection will be determined by UIC Public Safety and OVCAS Technology & Building Systems.

- b. Provide card readers at the following locations:
 - I. Building entrances
 - II. Laboratories
 - III. Vivarium entrances
 - IV. Mechanical and electrical rooms
 - V. Data/telecommunications rooms
 - VI. High-value storage or equipment rooms
 - VII. Controlled Substance storage areas

GROUNDS

Campus Grounds Coordination Requirements:

- a. The project shall comply with UIC Campus Grounds Standards and address the following specific requirements during design and construction coordination:
- b. Provide a smart irrigation system compatible with the campus standard Hydrowise platform, including an adequate wired connection.
- c. Adhere to the Tree Replacement Policy (caliper-for-caliper replacement of all removed trees).
- d. Include site landscape maintenance during the full warranty period (typically 1–2 years after substantial completion).
- e. Ensure all hardscape areas—including pavers, plazas, and service drives—are rated for vehicular traffic loading and accessible for maintenance vehicles.
- f. Coordination with the UIC Grounds Department shall occur during design development to confirm planting selections, irrigation zones, and maintenance access paths.

Video Surveillance

- a. All video cameras, intercoms, and associated security devices shall be User Agency-Furnished / Contractor-Installed.
- b. Security CAT6 cabling shall terminate in security-designated telecommunications closets, co-located but isolated from campus data networks; locations shall be approved by UIC Technology Solutions.
- c. UIC will furnish and install all network switches, servers, and licensing required for the security video system.
- d. Camera and intercom device placement shall be designed and approved by the UIC Chief of Police (or designee) and OVCAS Technology & Building Systems, including but not limited to:
 - I. Exterior building entrances, exits, and stairwells
 - II. Loading dock areas and service yards
 - III. Building perimeter routes
 - IV. High-security laboratory or research spaces
 - V. Controlled Substance storage zones

ENVIRONMENTAL HEALTH & SAFETY (EHS) REQUIREMENTS

The building shall comply with all UIC Environmental Health & Safety policies, Illinois Department of Public Health requirements, OSHA regulations, CDC/NIH laboratory guidelines, and best practices for laboratory environments.

- a. Chemical Safety
 - I. Provide chemical-resistant work surfaces in all laboratories.
 - II. Laboratory exhaust shall prevent cross-contamination between laboratories or adjacent spaces.
 - III. Hazardous exhaust streams (e.g., chemical fume hoods, solvent areas) shall be manifolded separately from general lab exhaust systems.
 - IV. Fume hood face velocity at all sash opening positions (including in loading/override) shall be no lower than 80 FPM.
 - V. Chemical storage rooms shall include dedicated exhaust, spill containment, and leak detection as required.
- b. Biosafety
 - I. HVAC systems shall allow future upgrading of selected spaces to BSL-2 standards.
 - II. Provide directional airflow, room pressure monitoring, and non-recirculating exhaust in high-risk areas.
 - III. Provide space and electrical capacity for future biosafety cabinets (BSCs).
- c. Indoor Air Quality
 - I. Maintain CO₂, VOC, temperature, and humidity within ASHRAE 62.1 limits.
 - II. Provide IAQ monitoring in high-occupancy or high-risk areas.
 - III. Provide adequate odor control in areas with solvents, fixatives, or tissue processing.
- d. Hazardous Materials Management
 - I. Provide a clear route for chemical delivery and hazardous waste removal.
 - II. Include designated hazardous waste accumulation space with required ventilation.
- e. Lab Pressurization
 - I. Maintain laboratories negative relative to corridors.
 - II. Pressurization shall be monitored, alarmed, and reported to BAS.
- f. Cage Wash & Sanitization
 - I. Provide dedicated exhaust
 - II. Use corrosion-resistant heat-recovery materials.
- g. Containment & Monitoring
 - I. Provide sloped floors with drains.
 - II. Install environmental sensors tied to BAS.

BUILDING ENVELOPE REQUIREMENTS

Resilient materials shall be incorporated in keeping with the 60-year life expectancy of the facility with an emphasis on maximizing recycled content. A high-albedo cool roof should be considered to limit the increase in surface temperature of the roof in summer months as to reduce cooling demands over conventional roofing materials and/or a green roof.

~~a. Air Leakage Performance~~

~~I. The building envelope air tightness will be tested by a third-party consultant reporting to the Owner's Commissioning Authority for compliance with the thresholds identified in Section C402.6.2 of the 2026 Illinois Stretch Energy Code. The anticipated testing protocol is ASTM E779 (Standard Test Method for Determining Air Leakage Rate by Fan Pressurization). In the event the required performance is not achieved following the execution of the testing protocol, the Design Builder will be responsible for the costs to remediate, retest, and document compliance with Exception 1 under section C402.6.2. II.~~

~~II. Target whole building air leakage: ≤ 0.2 cfm/ft² @ 75 Pa.~~

~~b. Thermal Performance~~

~~I. Wall U-value:~~

~~i. 2026 Stretch Energy Code: 0.044~~

~~ii. Maximum: 0.06~~

~~II. Roof U-value:~~

~~i. 2026 Stretch Energy Code: 0.03~~

~~ii. Maximum: 0.03~~

~~III. Glazing U-value: ≤ 0.30~~

~~i. 2026 Stretch Energy Code: 0.28~~

~~ii. Maximum: 0.30~~

~~IV. SHGC (Solar Heat Gain Coefficient):~~

~~i. 2026 Stretch Energy Code: 0.38~~

~~ii. Maximum: 0.38~~

a. Air Leakage Performance

I. The building envelope air tightness will be tested by a third-party consultant reporting to the Owner's Commissioning Authority for compliance with the thresholds identified in Section C402.6.2 of the 2023 Illinois Stretch Energy Code. The anticipated testing protocol is ASTM E779 (Standard Test Method for Determining Air Leakage Rate by Fan Pressurization). In

the event the required performance is not achieved following the execution of the testing protocol, the Design Builder will be responsible for the costs to remediate, retest, and document compliance with Exception 1 under section C402.6.2.

II. Target whole-building air leakage: ≤ 0.2 cfm/ft² @ 75 Pa.

b. Thermal Performance

I. The maximum U-value for opaque building assemblies shall meet the general requirements indicated below which are the stricter of UIC standards and 2023 Illinois Stretch Energy Code. See the Stretch Energy Code for additional assemblies and specifics.

i. Wall U-value (Metal Buildings): ≤ 0.5

ii. Roof U-value (Metal Buildings): ≤ 0.03

iii. Glazing U-value: ≤ 0.30

c. Moisture Protection

I. Continuous air barrier

II. Transition detailing

III. Thermographic inspections during commissioning

d. Roof Requirements

I. Provide equipment capacity and future expansion space.

II. Provide walkway pads around roof equipment.

Provided matrix is indicative of testing required if applicable to final design.

Table 2: Building Envelope Testing Matrix

SID	Test	System	Test Required by ASTM 2813	Specification Section	Mockup Testing	In-Situ Field Testing	Required Sampling Rate			
							Location	Specified Quantity	First Install Quantity	Progress Testing Quantities (10,60,90%)
1	ASTM C1715 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems	Brick Masonry	No		Yes	Yes	TBD	2 tests at each masonry surface	1 at 30-36" masonry	1 at top out
2	ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems	Air and water barriers	Yes	07 1113 07 2726	Yes	Yes	TBD	1 test/500 sqft.	5	15 locations at 10%, 60% and at 90%
3	ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers	Air and water barriers	Yes	07 1113 07 2726	Yes	Yes	TBD	1 test per 500 sqft. at each substrate	2 tests for each substrate type	2 tests for each substrate type at 10%, 60% and 90%
4	ASTM C1193 Standard Guide for Use of Joint Sealants, Appendix X1-Method A, Field Applied Sealant Joint Hand Pull Tab	Joint Sealants	Yes	07 9200	Yes	Yes	TBD	1 test per 1000 lf. of installed sealant at each location where adjacent materials change	1 test per floor per elevation	2 tests at 10%, 60% and 90%
5	ASTM C1521: Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints	Joint Sealants		07 9200	No	Yes	TBD	1 test per 1000 lf. of installed sealant at each location where adjacent materials change	1 test per floor per elevation	minimum 2 tests at 10%, 60% and 90%

6	ASTM E783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors	Vertical Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
7	ASTM E1105: Water Penetration of Installed exterior Windows, Skylights, Doors and Curtain Walls	Vertical Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
8	AAMA 501.2: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems	Vertical/Sloped Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
9	ASTM C1153: Practice for Location of Wet Insulation in Roofing Insulation Using Infrared Imaging	Roofing	Yes		Yes	Yes	TBD	1 test after roof completion	N/A	N/A
10	ASTM D7877: Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes	Roofing	No		Yes	Yes	TBD	1 test after roof completion	N/A	N/A
11	ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	Building Air Leakage	No		Yes	Yes	TBD		TBD	

12	AAMA 511 Sub Sill Storefront Flood Testing.	Aluminum Framed Entrance and Storefront	No		Yes	Yes	TBD		TBD	
13	ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies	Air and water barriers	No		Yes	Yes	TBD		TBD	
14	ASTM E966 – Field Measurement of Airborne Sound Attenuation of Building Facades and Facade Elements	Building Enclosure, Curtain Wall, Window, Roof	No		ASTM E90	Yes	TBD		TBD	1-3 locations at completion

QUALITY ASSURANCE AND COMMISSIONING ACTIVITIES

The Design-Build Team will be required to provide a quality assurance plan for review and acceptance by all stakeholders including the CxA. The plan should outline specific metrics and activities beyond those required by LEED that will be used throughout the duration of the project to assure quality. UIC and the CxA will have the authority to amend this plan at their discretion throughout the project and it will be the responsibility of the Design-Build Team to incorporate and report on all agreed upon metrics at scheduled milestones.

The Commissioning Professional and Engineer of Record shall participate in the initial development of the sequences of operation to align with the requirements and preferences of the university.

Upon acceptance of the controls shop drawings, the Commissioning Professional shall provide functional performance testing procedures to the Design-Build Team. Functional Performance Testing will not be permitted to start until each complete system in the facility has been provided with controls point-to-point checkout, final test and balance reports, and completed BAS graphics including trending.

COMMISSIONING REQUIREMENTS

- a. All systems in Divisions 07, 21, 22, 23, 25, 26 shall be commissioned by the CxA
- b. All systems in Divisions 27 and 28 shall be commissioned by either the CxA or another authorized party at the owner's discretion.
- c. NETA testing will be provided by a third party and the commissioning team will review reports.
- d. No sampling of systems shall be allowed.
- e. Include envelope commissioning and MBCx readiness verification.
- f. Trending requirements: 1-minute logging for lab & vivarium controls.
- g. Full functional testing in all modes of operation (cooling, heating, economizer, and emergency) of sensors, actuators, alarms, safeties, equipment, systems, and whole building IST.

The CxA will complete the following as required for LEED Fundamental Commissioning

- a. Assist with developing the OPR and review the OPR, Bridging-Documents, BOD, and design documentation
- b. Cx to participate in LEED charette
- c. Develop and implement a Cx Plan
- d. Confirm incorporation of Cx requirements into the construction documents
- e. Develop construction checklists
- f. Cx to perform TAB verification
- g. Review required testing reports
- h. Develop functional performance and integrated systems test procedures
- i. Direct and verify test execution
- j. Maintain issues log throughout the Cx process
- k. Prepare final Cx process report
- l. Document and report finding directly to the CDB and UIC throughout the process

The CxA will complete the following as required for LEED Enhanced Commissioning

- a. Review contractor submittals
- b. Verify inclusion of systems manual requirements in construction documents
- c. Verify inclusion of operator and occupant training requirements in construction documents
- d. Verify systems manual delivery
- e. Verify operator and occupant training delivery and effectiveness
- f. Review building operations in warranty period at 10 months after substantial completion
- g. Develop an on-going commissioning plan

BUILDING OCCUPANT AND O&M PERSONNEL REQUIREMENTS

FACILITIES MANAGEMENT REQUIREMENTS

- a. The design shall include dedicated storage areas sized to accommodate air filters, attic stock, and critical spare parts required for HVAC, plumbing, electrical, controls, and life-safety systems. Placement of equipment shall be centralized within dedicated mechanical rooms and accessible such that maintenance work will not disrupt facility operations. Electrical panels should be in dedicated electrical rooms accessible from public spaces.
Storage space shall be:
 - I. Located in an accessible, secure area within the building
 - II. Sized based on maintenance requirements and AHU filter change intervals
 - III. Capable of storing at least one year of critical maintenance parts for major equipment
 - IV. Double doors provided for exterior mechanical access where possible
 - V. Stairway with safety railing/guard provided for roof equipment access (Installation of equipment on grade or inside is preferred)
- b. Systems should be designed as to minimize the number of materials and spare parts that the owner is required to keep in inventory.
- c. The Basis of Design shall detail maintenance scenarios, including pathways and clearances. At a minimum it shall address the following: replacing HVAC filters, recharging water softeners, pulling chiller tubes, cleaning condenser coils, replacing exterior and interior lighting, accessing plumbing clean-outs, replacing AHU coils, replacing fan and pump motors.
- d. Clearance and Serviceability
 - I. Adequate clearance shall be provided around equipment and systems requiring maintenance or replacement. The design shall incorporate and specify access panels, walkways, stairs, and ample space to remove components requiring basic and extensive maintenance.
 - II. The Design-Build Team shall provide diagrams demonstrating adequate clearances for equipment are maintained with every submission, including in the initial competition phase.
 - III. Removal and future replacement of equipment must be possible with minimal effort. Minimal effort is defined by use of existing owner equipment. The exception being large equipment such rooftop units, chillers/heat pumps cooling towers.
 - IV. All equipment that will eventually need to be replaced must have a location specified in the drawings, along with provisions (i.e. access doors) for ease of replacement. This includes equipment such as valves, water hammer arresters, transformers for automatic flush/ sink valves, etc.
- e. Serviceability of Heat Recovery and Energy Recovery Wheels
 - I. Air handling units utilizing energy recovery wheels or other heat recovery components shall be designed for easy removal, maintenance, or replacement.
Requirements include:
 - II. Sufficient clearance around the wheel for removal without structural modifications
 - III. Sectionalized or field-dismantlable wheel construction
 - IV. Access panels sized for maintenance personnel and equipment
 - V. Compliance with all manufacturer serviceability standards
 - VI. Coordination with UIC O&M staff during design to verify access needs

- f. Floor-by-Floor Isolation Valves for Hydronic Riser Systems
 - I. Provide isolation valves on each floor for all hydronic risers, including but not limited to:
 - II. Heating water supply and return
 - III. Chilled water supply and return
 - IV. Domestic water supply
 - V. Laboratory process water
 - VI. Other riser-based systems as applicable

These valves shall:

- Allow floor-level shutdown without disrupting full-building operations
 - Be readily accessible in corridors, mechanical closets, or designated valve rooms
 - Be clearly labeled with permanent engraved tags
- g. The following criteria shall be met by the project design and construction
 - I. Ongoing Operations Criteria
 - II. Equipment and System Maintainability Expectations
 - III. Minimal warranty issues – the number of warranty issues that arise during the first year of operation.
 - IV. High Longevity – the mean time between failure and estimated longevity of the facility.
 - V. Limited number of occupant complaints – the number of occupant complaints tracked by type, time, and person by the facilities personnel.
 - VI. Availability of parts – the time it takes to receive a part from the time when its need was identified.
 - VII. No punch list items – the Construction Manager should ensure that no punch list items remain upon occupancy of the facility.
 - VIII.
 - h. Provision for recycling storage and collection shall meet LEED minimum prerequisites. Recyclable materials must include mixed paper, corrugated cardboard, glass, plastics, and metals. Take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste.

CMMS & BAS REQUIREMENTS

- a. Design-Build Team shall provide asset data for inclusion into a computer maintenance management system (CMMS):
 - a. Manufacturer
 - b. Model
 - c. Serial
 - d. Components (Filter size/type, motor size, belts etc.)
 - e. Checking requirements
 - f. Maintenance requirements
 - g. Troubleshooting items
- b. Design shall incorporate a system for tracking overall building utility consumption data (electricity, natural gas, water) along with appropriate submetering in keeping with LEED and

campus standards. System should be easy for facilities staff to access and upload into other platforms such as EnergyStar Portfolio Manager.

- c. All utility meters and sub-meters shall be connected to the campus network and use a common communication and data collection protocol. A complete energy monitoring system shall be provided which allows for real time energy data and trends to be displayed in a graphic format on a dashboard accessible through the building automation system graphics. The energy management system shall be capable of issuing automated regular reports to the facility operators which are configured to their preferences.
- d. The building automation system shall include a graphic which summarizes overall building pressurization as well as floor-by-floor pressurization. The graphic shall incorporate real time feedback from integrated points in the building and shall totalize outside air and exhaust flow rates. Building pressurization and air flow rates shall not be directly controlled by differential pressure sensors, but these sensors should be included to provide independent monitoring and alarming of total building pressurization.

O&M TRAINING

The training requirements for the project shall include a variety of training sessions for operations and maintenance personnel and building occupants. Operation and maintenance manuals are to be provided for review 90 days prior to training. Design engineer, contractor and building staff shall be present for training. Training shall occur in conjunction with each phase of construction to ensure staff understand equipment operation prior to occupancy.

Training sessions shall be conducted with personnel separate from any video recorded training sessions. Video recorded training sessions shall be separately planned and executed after the sessions delivered to the O&M and occupant teams. These sessions shall incorporate information from these training sessions. Videos shall be organized and archived as part of the construction scope of work.

Training program shall be functionality-based rather than hours-based with training topics provided to the owner in an agenda in advance of training. The following defined objectives should be designed into the training program.

- I. The design team gives an overview of the design intent for to users and operations staff (collectively referred to as O&M).
- II. Appropriate levels of training are provided for both the users and O&M staff.
- III. HVAC building automation system shall include detailed instruction on use of the building automation system for normal operations, troubleshooting and resolving problems.
- IV. Provide training based upon the operational management plan, preventative maintenance program, steps to ensuring sustained system performance, and minimization of emergency repair and replacement costs developed for this facility.
- V. Provide training on the interaction of the mechanical systems relative to the energy efficiency of the facility.
- VI. Provide training for specific components relative to both operational and preventative maintenance procedures and interaction with its connected systems.

- VII. Training for contractors on installing special systems/equipment – provide training by the manufacturer on the proper installation and start-up of systems and equipment.
- b. Documentation:
 - I. Record drawings are accurate (include TAB) – the record documentation has been verified to be accurate and it is provided in a usable format.
 - II. Troubleshooting – a troubleshooting matrix is provided to typical issues anticipated for the system relative to OPR.
 - III. Accurate start-up and shut-down procedures – easy to find and follow start-up and shut-down procedures are available to the O&M staff.
 - IV. Detailed how-to manuals – manuals provide clear and concise how-to guidance.
 - V. Completed accurate information – all documentation is accurate and complete.
 - VI. Detailed sequence of operation – detailed sequence of operations on any low voltage system with software logic diagrams.
 - VII. Video training for new personnel (various for different levels of knowledge) – DVD, indexed and edited recording of training for easy access to O&M staff when required.
 - VIII. One line diagrams will be provided by design team for all major systems, including Steam, CW, HW, normal power, critical power, domestic water, fire system, low voltage systems, etc.
 - IX. Technical support numbers – easily located technical support telephone numbers and contact information.
 - X. Detailed maintenance schedule – simple maintenance schedule matrix detailing what is required when.
- c. A final commissioning record shall be provided to the owner as developed by the CxA. The commissioning record is a composite document that will include final project documentation, including: OPR, BOD, Cx Plan, Cx Progress Reports, Schematics and BAS GUI overview, Functional Performance Test Scripts, and other relevant materials.

APPENDICES

APPENDIX A: ACCEPTABLE MANUFACTURERS

This list establishes the baseline for acceptable equipment manufacturers for the Drug Discovery & Cancer Research Pavilion (DDCRP). Manufacturers listed herein have been verified for performance, maintainability, and compatibility with UIC standards.

Alternate manufacturers must be reviewed and approved by CDB and UIC PSPM prior to submittal acceptance.

Grouped by discipline for clarity and alignment with UIC Building Standards. Any equipment not listed shall be referred to the campus building standards. Equipment with a single manufacturer will be sole-sourced by UIC through the CDB process.

Table 3: Acceptable Manufacturers

Division / System	Equipment Type	Preferred Manufacturers
HVAC Systems	Air Handling Units	Ventrol, Thermal Corp, TMI
HVAC Systems	Exhaust Fans	Twin City, Strobic
HVAC Systems	Pumps	Bell & Gossett, Armstrong, Taco
HVAC Systems	Venturi Valves	Triatek
HVAC Systems	Chilled Beams	Semco
HVAC	Terminal Units (VAV, FCU, BCU etc.)	Nailor, Krueger & Trane
BAS	Tridium	Alerton & Distech with Tridium N4
BAS	Control valves & Damper Actuators	Belimo
BAS	AFMS	Ebtron, Air Monitor, Paragon
BAS	Room Pressure Monitors	TSI, Serta & Triatek
Electrical Systems	Switchgear & Panels	Square D & ABB
Electrical Systems	Transformers	Square D & ABB

Electrical Systems	Lighting Fixtures	Lutron Athena, Acuity, Wattstopper
Electrical Systems	VFD	ABB
Electrical Systems	Fire Alarm	Notifier
Plumbing Systems	Pumps	Bell & Gossett, Grundfos & Armstrong
Plumbing	Air Compressor	Hertz, BeaconMedaes, Chemetron, Quincy, Powerex
Renewable Energy Systems	Solar Panels	LONGi, Trina Solar, Canadian Solar and JA Solar
Renewable Energy Systems	Microinverters	SMA Solar Technology (Preferred), ABB / Hitachi Energy, Schneider Electric (Conext / EcoStruxure), Fronius

General Requirements

1. Equipment from listed manufacturers shall be standard production models, not prototypes.
2. Substitutions must include performance data, maintenance documentation, and proof of BAS compatibility.
3. All equipment shall comply with UIC Building Standards and BAS Integration Guidelines.
4. Final acceptance of alternates is at the discretion of CDB & UIC PSPM and may require testing.
5. Maintain consistency across campus for parts, service.

APPENDIX B: LEED REQUIREMENTS

LEED Certification – The Design-Build Team is required to achieve the project LEED Gold certification target in accordance with the requirements established in the LEED Rating System for LEED v.4. The goal in achieving LEED Gold certification is to deliver a facility that provides an excellent work and testing environment for employees and staff, and also delivers long-term energy and water resource savings.

It is anticipated that the Design-Build Team will utilize an integrative design process and sustainability best practices to develop a facility that achieves the Owner’s project LEED goals. This will require early and collaborative goal setting, early energy modeling and water budgeting, and using updates to this modeling and other technical analyses throughout design, as well as an integrative analysis and process, to guide design decisions.

Specific Design-Build Team responsibilities shall include:

- Provide qualified LEED Coordinator during design and construction.
- Develop LEEDv4 scorecard that complies with Owners Project Requirements (OPR) document. Scorecard is to be developed as outcome of Goal Setting meeting. Scorecard is not accepted until reviewed and approved by Owner.
- Provide Plans, procedures and calculations, procure materials, and provide documentation necessary to develop the design to meet Owner Sustainability and LEED goals, and to obtain Prerequisites and credits required for LEED certification.
- Respond to questions and requests for additional information from Owner and project LEED Administrator, and the USGBC, regarding LEED Prerequisites and credits until the USGBC has made its determination on the project's LEED certification application. Respond in format acceptable to Owner, project LEED Administrator and USGBC.
- LEED Online Submittals: Upload project LEED documentation submittal data directly to USGBC “LEED Online” website.
- Completed LEED certification process. Work is not complete until Owner has accepted USGBC’s final review of LEED certification, and LEED plaque is procured and installed.
- Include all costs associated with LEED review, and with purchase and installation of plaque upon project certification. Include Appeals should they be required to earn the LEED prerequisites and necessary credits.

Meetings:

- LEED Goal Setting meeting: Coordinate with Owner, LEED AP and CxA and Stakeholders as identified by Owner, to schedule, participate in, and document a LEED Goal Setting meeting within 14 days of award, and prior to further commitment of design direction, to set direction for design and ensure Owner goals are met.
- A LEED Scorecard with targeted credits to achieve project LEED goals will be produced from this meeting.
- Develop a LEED Action Plan to support the Scorecard that describes how each targeted credit will be achieved by the project’s design and construction.

- **LEED Progress meetings:** Facilitate and document monthly LEED progress meetings, which will be conducted throughout design and construction to ensure progress in meeting LEED goals. For each meeting, provide updates to design and calculations, and documentation and reporting as appropriate by project phase. LEED Action Plan updates may be used to provide design phase updates.
- **LEED Construction Kick-off meeting:** Coordinate with Owner and LEED AP to schedule and conduct and document meeting prior to mobilization to the site. Review LEED requirements as outlined in the LEED scorecard and Action Plan. Review construction phase LEED Plans for compliance with LEED requirements.
- **Attendees:** Authorized representatives of Owner, LEED Administrator, Commissioning Authority, A&E, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend meetings. Participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

Submittals:

- **Basis of Design (BOD):** Provide a BOD for review by the LEED consultant and Commissioning Authority that shows in detail how the requirements of the OPR are met in the design. The BOD content and format should follow requirements in the LEED Fundamental Commissioning at a minimum.
- **Energy modeling iterations, site assessment, and water budgeting calculations.**
 - Initial modeling and calculations must be undertaken as soon as possible and before commitment to design direction, to inform design decision-making and to provide evidence of compliance with the Integrative Design process. In this way, they will provide value in informing decision-making in the design process.
 - Provide iterations of modeling and calculations to support LEED Action Plan updates at each design milestone.
- **Commissioning and LEED review of plans and specifications** shall be undertaken in conjunction with the Owner project milestone reviews. Per LEED requirements, Cx reviews must be undertaken no less than the equivalent of mid-construction documents and in a back-check set with review comments addressed / incorporated. Provide complete drawings and specifications for these reviews.
- **LEED Action Plan:** Provide initial Plan for review as a product of the LEED Goal Setting Meeting. Refine and provide with each milestone design submittal. . Updates to Plan shall be provided monthly for the duration of the project.
 - Plan shall be electronic and accessible at all times for review of progress.
 - LEED Action Plan shall indicate how each targeted LEED credit and prerequisite will be met, including a listing of all required submittals and calculations, percentage complete, progress update notes, applicable product data for material selection, certifications for construction practices, procurement data, cumulative calculations, final calculations, information needed from Owner, and action items with name of individuals responsible.
 - Construction phase LEED Plans will be required for specific LEED Prerequisites and credits. These Plans must be provided as project submittals.

- LEED Progress Reports: Throughout project duration, concurrent with each Application or Payment, or as directed by Owner, submit monthly reports in format as directed by Owner and project LEED Administrator, documenting compliance with approved LEED Action Plan, and comparing actual design and construction and procurement activities with LEED Action Plans, and to track progress across all targeted LEED Prerequisites and credits.
- Construction phase LEED product or material submittals are in addition to other technical submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as separate submittals to verify compliance with indicated LEED requirements.

13.12 COMMISSIONING PLAN

Commissioning Plan

UIC Drug Discovery and Cancer Research Pavilion

University of Illinois Chicago
Illinois Capital Development Board

CDB Project 830-030-167

Date: 5/29/2026

Version: 1.2

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1 Purpose of the Commissioning Plan

Commissioning is a process to systematically evaluate that the Owner's Project Requirements (OPR) are being met throughout the project – during design, construction, and operation of the facility. Each commissioning activity provides documentation showing the effectiveness of project's quality control procedures and highlights areas where the owner's requirements are not being met.

Commissioning is not a substitute for design and construction best practice that incorporates effective quality control processes. The commissioning process augments the construction team and represents ownership through a series of structured checks and balances at specific milestones throughout the project, as detailed within this document. The goal of commissioning is to facilitate the transitions through the phases of the project and coordinate documentation, showing areas where the OPR is not fully being met and ideally, a path to correction.

Commissioning also plays a critical role in supporting LEED certification efforts by ensuring that the project meets the rigorous standards set forth for energy efficiency, environmental stewardship, and quality assurance. It provides documented verification that systems are operating as intended, which is a fundamental requirement for LEED Enhanced Commissioning credits. Through systematic testing, detailed documentation, and collaborative communication among project teams, the commissioning process not only validates design intent but also sets the foundation for a building that performs reliably and sustainably over time.

The Commissioning Plan provides a roadmap of the commissioning process for this project. It serves as a reference for project team members and acts as a depository for the records and the results of the commissioning process, thus considered a living document. At the end of the process, the Commissioning Plan will become the Final Commissioning Report.

To facilitate the commissioning process, Farnsworth Group utilizes CxAlloy TQ as a means of collaboration and issue tracking. This cloud-based application provides transparency, analytics, increased communication, and improved quality to the overall project. Each team member will be able to access and view their assigned commissioning tasks and issues online through their own individual profile.

To access your project through CxAlloy, you will receive an email invitation from Farnsworth Group. The link in the email will allow you to set up a username and password. Once that has been completed you will be able to begin collaboration on the project as a stakeholder in the commissioning process.

Table 1: Activity Completion Status

Activity Name:	Status:	Date of Completion:
Owner's Project Requirements	ONGOING	TBD
Commissioning Specifications	ONGOING	TBD
Basis of Design Review	PENDING	TBD
Design Reviews	PENDING	TBD
Submittal Reviews	PENDING	TBD
Construction Checklists	PENDING	TBD
Site Visits and Cx Meetings	PENDING	TBD
Project Kick-Off Meeting	PENDING	TBD
Pre-Bid Meeting	PENDING	TBD
Pre-Construction Meeting	PENDING	TBD
Testing and balance Verification	PENDING	TBD
Functional Performance Testing	PENDING	TBD
Systems Manual	PENDING	TBD
Warranty Review	PENDING	TBD
Issues Log	PENDING	TBD

Table 2: Summary of Cx Plan Revisions

Version:	Date:	Revision Notes
1.0	01/23/26	Initial Draft of Cx Plan Prepared
1.1	03/12/26	Aligned with Bridging Team Comments
1.2	05/29/26	Aligned Appendix A with Building Envelope Testing Discussion
1.2.1	07/07/26	Administrative revision – corrected date and formatting

2 Project Description

The University of Illinois at Chicago (UIC) proposes to construct a new approximately 189,000 gross square foot building identified as the Drug Discovery and Cancer Research Pavilion (DDCRP) on its West Campus. The building will provide research space to support the University's Retzky College of Pharmacy (CoP), UI Cancer Center, Department of Chemistry (within the College of Liberal Arts and Sciences), and UICentre as well as an underground Vivarium operated by the Biological Resources Laboratory (BRL).

The DDCRP provides advanced laboratories, vivarium facilities, core research spaces, and offices to support interdisciplinary collaboration in drug discovery and cancer research. The project consolidates research groups and aligns with UIC's mission to promote translational biomedical innovation. To support this broad approach to drug discovery and deployment, the new DDCRP will include the following core programs: Pharmacy, Vivarium, Chemistry and Cancer Research.

3 LEED Certification Goals and Commissioning Requirements

As stated within the Owner's Project Requirements (OPR) the project shall achieve LEED v4 Gold Certification through building and site design, without reliance on owner policy or purchases. The LEED strategy will be developed based on UIC's Sustainable Design and LEED Standards, and fulfill the requirements for both Fundamental and Enhanced Commissioning, along with Building Enclosure and Monitoring Based Commissioning.

All commissioning activities will be guided by the OPR and detailed project specifications, ensuring that each system is installed, tested, and optimized in alignment with design intent.

Outline of Owner's Project Requirements (OPR):

- Purpose and Intent
- Project Overview
- Sustainability Requirements
- Design & Performance Goals
- Quality Assurance and Commissioning Activities
- Building Occupant and O&M Requirements

Enhanced Commissioning Practices:

Adopting the LEED Enhanced Commissioning criteria, the process will extend beyond basic system verification to include comprehensive functional performance testing, third-party verification, and proactive system integration checks. This ensures that systems not only meet design specifications but also operate efficiently under actual operating conditions.

Enclosure and Monitoring-Based Commissioning:

Special attention will be given to building enclosure integrity and continuous monitoring of system performance. Commissioning activities will assess the enclosure's thermal performance and air leakage characteristics, while ongoing monitoring protocols will be established to verify that system operations align with energy performance and indoor environmental quality targets.

4 Commissioning Scope Categories

The following table outlines the scope of commissioning activities, encompassing critical building systems, including Building Enclosure, HVAC Systems, Electrical and Lighting Systems, Plumbing and Water Systems, Building Automation and Controls, and Specialty Services such as security, fire alarm, and communication.

Table 3: Equipment to be Commissioned

Item	Category	System
1.00	MECH/ ELEC	Building Automation System
2.00	MECH	Heating and Ventilation (Major Equipment + Distribution)
3.00	MECH	Heating and Ventilation (Terminal & Minor Equipment)
4.00	MECH	Cooling System (Major Equipment + Distribution)
5.00	ELEC	Lighting Controls (Daylight, Occupancy, Schedule)
6.00	ELEC	Emergency Power and ATS
7.00	MECH/ ELEC	Life Safety Integration (Emergency Shutdown/Operation)
8.00	ELEC	Electrical Distribution
9.00	PLMB	Domestic Hot Water System
10.00	PLMB	Water Treatment as req.
11.00	ELEC	Security and Access Systems
12.00	PLMB	Plumbing and Storm System (Sump Pump, Elevator Pit)
13.00	ELEC	Emergency Lighting
14.00	ARCH	Building Enclosure (Water Penetration, WBAT)
15.00	SPECIALTY	Specialty Lab Services discussed in verification of third party testing of section

5 Independent Verification of Testing by Third Parties

To ensure compliance with project requirements and industry best practices, independent third-party specialists will be engaged by the D-B team to perform testing and verification for various building systems. These efforts will be coordinated with the Commissioning Authority (CxA) and are detailed within the Project Manual and relevant contract documents.

Building Enclosure

Third-party testing agencies will conduct performance testing on the building enclosure. The CxA will review and verify all test results to ensure compliance with project specifications and performance criteria.

Metering and Energy Management

Metering and energy management verification requirements are outlined within the commissioning specifications and relevant divisions 22, 23 & 26. This includes electrical power and energy monitoring; chilled water, heating hot water and natural gas utility use; and domestic water utility use. The CxA will ensure integration and proper reporting functionality.

Automated and Monitoring-Based Commissioning

A subcontractor to the CxA, CopperTree, will install an end-device on the building network to aggregate Building Automation System (BAS) data points. Reported values will be remotely analyzed via a cloud-based platform to assess system performance and identify potential optimization opportunities.

Power Distribution

Load bank testing and emergency power load transfer testing will be performed by the electrical subcontractor and verified by the CxA. The CxA will organize an Integrated Systems Test (IST) involving all relevant trade partners to validate system behavior under real-world operating conditions. Additional electrical testing will be conducted per specification 26 61 00 by the installing electrical contractor and confirmed by the CxA.

Security Systems

Security systems, including access control, intrusion detection, and video surveillance, will be installed and pre-commissioned by the contractors responsible. The CxA will verify installation quality and system functionality through a sampling-based testing approach.

Compressed Air Systems

The CxA will review pre-functional checklists and startup reports while verifying that system pressures meet required performance thresholds for effective control and operation.

Fume Hoods

Airflow control systems will undergo functional performance testing, with ASHRAE 110 compliance testing performed by third-party specialists.

Negative Pressure Laboratories

The CxA will collaborate with the Test and Balance (TAB) contractor to verify differential pressures across space adjacencies. These measurements will be confirmed during the integrated system test to ensure proper containment and air exchange rates.

This independent verification process ensures that all critical systems are rigorously tested and meet the required performance standards before occupancy and operation.

6 Commissioning Roles & Responsibilities

Commissioning Authority (CxA) Role and Qualifications

Farnsworth Group is the designated Commissioning Authority (CxA) and acts as an independent, certified professional provider responsible for overseeing the commissioning process in alignment with LEED Enhanced Commissioning requirements. Key qualifications include expertise in mechanical, electrical, and envelope systems, as well as experience with commissioning best practices, energy efficiency standards, and performance verification methodologies. The CxA provides objective oversight, facilitates commissioning activities, and delivers documentation necessary for LEED certification compliance.

Contract Holder - State of Illinois

The CDB oversees the design and construction of state-funded facilities and selected Farnsworth Group as the CxA for the project through a Qualifications Based Selection (QBS). The CDB is responsible for setting overall project delivery expectations and enforcement of commissioning activities as one part of the entire delivery process.

Client Agency

UIC defines project performance goals, approves the OPR with CDB support, and ensures that commissioning is integrated into project delivery.

Design-Build Team

The Design-Build Team collaborates with the CxA to integrate commissioning requirements into the design and construction process, ensures compliance with specifications, and provides system documentation and training for operations staff.

Operations Staff

Engages in commissioning activities, attends training sessions, and ensures continuity of best practices in system operation and maintenance post-occupancy.

7 Project Team & Key Stakeholders

The CDB Project Managers are Kenneth Watkins and Nazih Kafe. The bridging documents are led by Holibird&Root Architects and dbHMS (MEP), and the competition winning Design-Build Team is yet to be determined.

Table 4: Contact Information

Name	E-mail	Title	Company
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8 Commissioning Roles & Responsibilities

Phase	Activity	Responsibility			
		Owner	CxA	Bridging Team	D-B
Overall	Schedule	Review & provide feedback	Review & provide feedback	Review & provide feedback	Responsible
Overall	Pay Applications	Responsible	Review & provide feedback	-	Responsible
Overall	DB Procurement	Responsible	Inform	Inform	-
Overall	LEED Management	Review & provide feedback	Review & Documentation submission for Certification	Review & provide feedback	Design/Construction Documentation
Overall	Cx Issues Log	Review & provide feedback	Responsible - manage	Responsible - resolve & respond	Responsible - resolve & respond
Bridging	Owner's Project Requirements (OPR)	Define key project requirements & approve changes	Document & update	Review & provide feedback	Review & provide feedback
Bridging	Commissioning Plan	Review & provide feedback	Responsible	Review & provide feedback	Review & provide feedback
Bridging	Basis of Design	Review & provide feedback	Review & provide feedback	Responsible	Responsible/ Update
Bridging/ D-B	Design Reviews	Review & provide feedback	Review & provide feedback	Issue & respond to comments	Issue & respond to comments
Bridging/ D-B	Project Specifications	Review & provide feedback	Review & provide feedback	Responsible	Responsible
D-B	Submittal Reviews	Review & provide feedback	Review & provide feedback	-	Responsible
D-B	Construction Checklists	Informed	Responsible - manage	-	Responsible - resolve & respond

D-B	Cx Site Visits	Informed	Responsible	-	Informed
D-B	Cx Meetings	Informed	Responsible	-	Participate & respond
D-B	Functional Performance Test Development	Review & provide feedback	Responsible	-	Review & provide feedback
D-B	O&M manual review	Review & provide feedback	Review & provide feedback	-	Responsible
D-B	Systems manual	Review & provide feedback	Responsible	-	Review & provide feedback
Acceptance	Startup & acceptance tests	Review & provide feedback	Review & provide feedback	-	Responsible to provide reports & resolve issues
Acceptance	Building Enclosure Testing	Review & provide feedback	Responsible TBD		Responsible TBD
Acceptance	Building Enclosure Commissioning	Review & provide feedback	Responsible		Participate & respond
Acceptance	Owner Training Review	Responsible - assign the right people to participate	Review & provide feedback	-	Responsible
Acceptance	Test & Balance Verification	Informed/ encouraged to participate	Responsible - witness readings	-	Responsible - conduct TAB verification
Acceptance	Functional Performance Tests	Informed/ encouraged to participate	Responsible - witness and document results	-	Responsible - conduct tests and demonstrate system functionality
Warranty	Closeout documentation	Review & provide feedback	Review & provide feedback	-	Responsible

Warranty	Commissioning Final Report	Review & provide feedback	Responsible	-	Review & provide feedback
Acceptance	Warranty Site Visits	Review & provide feedback	Responsible	-	Responsible to correct issues discovered
Warranty	Seasonal Testing	Review & provide feedback	Responsible	-	Responsible to correct issues discovered
Warranty	Warranty Review	Review & provide feedback	Responsible	-	Responsible to correct issues discovered

9 Communication and Coordination Protocols

Effective communication between all project stakeholders is essential for successful commissioning. Regular coordination meetings will be conducted aligned with key project milestones, with structured agendas and documented action items. This includes pre-installation coordination meetings and post-installation corrective action meetings as required with sufficient notice.

The CxA will provide progress reports, testing schedules, and issue logs to ensure alignment between the owner, Design-Build Team, and operations staff. A centralized commissioning document repository will be maintained for version control and transparency through CxAlloy. Any issues identified during commissioning will be tracked, prioritized, and resolved through a structured review process with clear accountability. It will be the responsibility of the entire team to respond through the online system officially, though naturally communication will occur in other forms. It is the request of the CDB that any formal emails include the project number (830-030-167) in the title and include both the project manager and owner.

Whenever possible, Farnsworth Group will facilitate issue resolution on behalf of the CDB/UIC without cost or schedule impact or adjustment to the OPR. These issues will be documented for the record, but closed on resolution. All other issues will require CDB/UIC acceptance with input from the A/EOR as may be necessary.

Any outstanding responses to questions or issues that impact the commissioning process and achievement of the OPR over 1 week will be automatically escalated.

Any outstanding issues past 2 weeks of resolution will be summarized and incorporated by the D-B team into their Procore log. It is the responsibility of the D-B to manage issue resolution, not the CxA. Though we will help facilitate as best we can. Issues within CxAlloy are typically more verbose than a punchlist item and it is far more efficient for the D-B team to use their Project Management Tool to maintain a prompt path to resolution.

10 Bridging Document and Design-Build Design Phase Activities

Commissioning during the Bridging and Design-Build (D-B) phases establishes a clear framework for system performance, quality assurance, and long-term operational efficiency. By integrating commissioning early in the process, project requirements are well-defined, contractor selection is informed, and design decisions are aligned with the Owner's Project Requirements (OPR) and LEED goals. The Commissioning Authority (CxA) plays a key role in guiding these activities, ensuring a seamless transition into construction and performance verification.

Bridging Phase & Commissioning Specifications Development

The CxA collaborates with the owner to develop the OPR, defining project performance criteria. Initial guide commissioning specifications are drafted to outline functional performance requirements, documentation expectations, and system testing protocols.

Design-Build Team Selection & Design Reviews

The CxA supports the Qualifications-Based Selection (QBS) process, helping the CDB assess prospective D-B teams on demonstrated commissioning experience and technical expertise. This involves review of the basis of design (BOD) and preliminary design documentation developed in the competition. Post-selection, during design, the CxA conducts progress reviews (30%, 60%, and 90%) to verify compliance with the OPR, technical standards, and energy efficiency goals. Any issues brought up during the design review process will be included in the issues log. These items will be tracked with CxAlloy.

Final Commissioning Specifications & Project Integration

The CxA refines and finalizes commissioning specifications, ensuring they are fully incorporated into the contract documents. This establishes clear expectations for system verification, functional performance testing, and documentation to support both LEED certification and long-term building performance.

11 Construction Phase Activities

During the construction phase, commissioning activities focus on verifying that all systems are installed according to design specifications and are prepared for functional testing. The Commissioning Authority (CxA) will conduct regular site visits to assess installation quality, review submittals, and ensure that commissioning requirements are integrated into the construction process.

Submittal and Shop Drawing Reviews

The CxA will review relevant submittals, shop drawings, and product data to confirm compliance with the Owner's Project Requirements (OPR) and project specifications.

Construction Checklists

Pre-functional checklists (PFCs) will be completed by contractors to document correct installation before startup and testing.

Site Observations and Issue Resolution

The CxA will perform periodic site inspections to identify deficiencies, track commissioning-related issues, and coordinate resolutions with the construction team.

Equipment Start-Up Verification

The CxA will witness manufacturer-recommended startup procedures for critical systems to ensure they are functioning as intended prior to functional testing.

Building Enclosure Testing

Testing agencies will conduct air barrier, water infiltration, and thermal performance tests, with results reviewed by the CxA.

Preliminary Controls and BAS Verification

The CxA will verify BAS sensor installation, calibration, and point mapping in preparation for system performance testing.

Functional Performance Test (FPT) Planning

Test procedures will be developed and scheduled in coordination with the construction team and trade contractors.

Automated Commissioning (ACx) Setup

Cloud-based automated commissioning tools will be set up to run in parallel with the traditional Functional Performance Testing process in the Acceptance Phase. This system will allow for 100% sampling and a more streamlined approach to issue tracking and closeout.

12 Pre-functional Checklists (PFCs)

Pre-Functional Checklists (PFCs) are a critical component of the commissioning process, ensuring that systems are properly installed, complete, and ready for Functional Performance Testing (FPT). These checklists provide a structured method for confirming that each system and component has been installed in accordance with contract documents, manufacturer guidance, and industry best practices before final testing begins.

Contractor Attestation & Responsibility

The installing contractor is responsible for completing all PFCs and attesting that systems are fully installed and ready for final testing.

Equipment is installed per design and specifications.
Manufacturer requirements have been followed.
Equipment is free from visible damage and ready for operation.

Completed PFCs will be field verified by the Commissioning Authority (CxA) to confirm compliance and readiness.

Checklist Requirements & Documentation

To streamline the process while ensuring all valuable information is captured, PFCs will be kept as concise as possible while including key verification points.

Site Delivery & Storage Documentation – Photos confirming that equipment was stored properly and undamaged.
Equipment Information – Make, model, serial number, and warranty start/end dates.
Installation Verification – Confirmation that installation meets contract documents, approved submittals, and manufacturer guidance.
Basic Operational Checks – Verification of proper mounting, connections, and safety requirements before powering on.
Pre-Startup Readiness – Checking that all necessary utilities (power, water, airflow, etc.) are in place.

To maintain efficiency, PFCs will be spot-checked by the CxA, ensuring critical verification while minimizing unnecessary administrative burden.

Agile & Risk-Based Approach to Pre-Testing

Rather than waiting until Functional Performance Testing to identify issues, we take an agile, risk-based approach to pre-test systems early. This proactive approach minimizes costly delays during final testing, ensuring that systems are ready for efficient and successful Functional Performance Testing.

Targeted Pre-Checks – Focusing on high-risk or complex systems to catch issues before final testing.

Spot-Testing in the Field – Selecting systems or components for early operational checks to identify potential deficiencies.

Early Issue Resolution – Addressing installation concerns or integration conflicts before they impact the full system test.

13 Acceptance and Warranty Phase Activities

Acceptance Phase commissioning focuses on verifying full system functionality, optimizing performance, and ensuring a smooth transition to building operations. This phase includes detailed testing, training, and documentation to support long-term system reliability.

Functional Performance Testing (FPT)

The CxA will conduct performance testing of HVAC, lighting, power distribution, water systems, and other critical components to verify compliance with Owner's Project Requirements and contract documents. Testing will be coordinated with the Test and Balance (TAB) contractor, electrical subcontractors, and control system vendors.

Integrated Systems Testing (IST)

Systems such as emergency power, life safety, and laboratory controls will be tested under real-world operating conditions to validate proper integration and continuity of safe operations.

Deficiency Resolution and Re-Testing

Identified issues will be documented in a commissioning log, with corrective actions implemented and verified before project closeout.

Building Operator Training

Training sessions will be organized by the D-B team and conducted by manufacturer and/or installing contractors to familiarize operations staff with system controls, maintenance requirements, and energy management strategies. Supplemental documentation generated by the CxA such as the Systems Manual and Current Facility Requirements will augment standard training. To support a smooth transition, lessons learned through commissioning will be shared with facility operators in a dedicated soft-landing discussion with the opportunity to engage and ask questions openly.

Final Commissioning Report

This document will ultimately serve as a comprehensive report summarizing commissioning findings, test results, and system performance verification will be provided to the owner.

Monitoring-Based Commissioning (MBCx) Setup

Cloud-based analytics and continuous monitoring tools will be established to track ongoing system performance post-occupancy.

14 Functional Performance Testing

Functional Performance Testing (FPT) is a critical phase of the commissioning process, ensuring that all building systems perform as intended under all expected operational conditions. The development of FPT procedures is based on a thorough review of design drawings, specifications, equipment submittals, manufacturer guidelines, and input from the Design-Build Team. This approach ensures that testing protocols align with the design intent, owner's project requirements (OPR), and system integration needs.

Testing Scope and Conditions

Functional testing will be conducted to verify system performance across all modes of operation, including:

Normal Occupied Mode – Ensuring all systems function as expected under typical daily use.

Unoccupied Mode – Verifying setback and energy-saving strategies.

Emergency Operations – Testing backup power, life safety systems, and emergency ventilation response.

Full Design Load Conditions – Simulating peak operational demand to confirm systems meet performance criteria.

For this laboratory building, it is essential to test and verify the functionality of base building infrastructure (HVAC, electrical, plumbing, and controls) before laboratory equipment is installed.

This ensures that the environmental and utility systems supporting lab operations are stable and meet stringent performance requirements before sensitive laboratory testing equipment is brought online for calibration.

Seasonal and Deferred Testing

Certain systems, such as chillers, boilers, and economizers, require seasonal testing to confirm performance under both cooling and heating conditions. These tests will be scheduled to align with appropriate weather conditions or, when necessary, simulated conditions. Additionally, deferred testing will be planned for any systems that cannot be fully tested during the initial commissioning period, ensuring that all functional parameters are eventually verified.

Test Coordination and Execution

Advance Test Review – Functional test procedures will be shared with the responsible installing contractors in advance of testing to ensure proper preparation and coordination.

CxA Oversight – The Commissioning Authority (CxA) will direct and oversee all testing to ensure objective execution, adherence to procedures, and resolution of deficiencies.

Contractor Involvement – Installing contractors will actively participate in testing to confirm proper system function and to facilitate knowledge transfer for long-term system maintenance.

15 Training and Operations Support

A successful commissioning process extends beyond system verification and testing to ensure that facility personnel are fully prepared to operate and maintain the building systems efficiently. The commissioning team will work hand in glove with facility operations administration and staff to facilitate training, and provide documentation and ongoing support to facilitate a seamless transition from construction to full occupancy.

Training Verification & Participation

The Commissioning Authority (CxA) will verify that training requirements are met, ensuring that all required sessions are conducted, documented, and attended by the appropriate facility personnel.

Operations & Maintenance (O&M) Information Review

Prior to turnover, the commissioning team will review the provided O&M manuals, ensuring they are complete and accurate including:

- Equipment cut sheets, sequences of operation, and maintenance procedures.
- Recommended spare parts lists and preventative maintenance schedules.
- Warranty details, including coverage terms and claims procedures.

Current Facility Requirements (CFR)

A LEED required document defining the owner's operational needs, energy efficiency goals, and system performance expectations to guide long-term building performance.

Systems Manual

A LEED required consolidated reference document providing facility personnel with system descriptions, control sequences, emergency procedures, and troubleshooting guidance.

“Soft Landing” Discussion for Facilities Handoff

To ensure a smooth transition, the commissioning team will conduct a “Soft Landings” discussion summarizing key findings and recommendations from the commissioning process. A review of lessons learned and common troubleshooting issues. Discussion of any outstanding issues, deferred testing, and seasonal commissioning plans. Clarification of how to access and utilize the commissioning documentation.

Monitoring-Based Commissioning (MBCx) for Ongoing Support

To further support operational performance, a Monitoring-Based Commissioning (MBCx) platform will be deployed throughout the warranty period and beyond. This platform will provide real-time system monitoring to identify anomalies and operational inefficiencies along with:

- Assist facility teams in troubleshooting issues proactively, reducing downtime and maintenance costs.
- Validate that systems continue to meet performance benchmarks established during commissioning.

16 Commissioning Activity Summary

Table 5: Commissioning Activity

Item	Phase	Activity	Prerequisite	Completion Milestone	Date	Deliverable
1.00	Planning	Develop Owner's Project Requirements (OPR) outlining key project requirements and performance criteria for success.	Owner Feedback	Early-Design / Late-Design	In Progress	OPR includes indoor environmental quality, energy, sustainability & maintainability requirements along with quality assurance integration with Cx.
1.01	Design	Review Basis of Design Documentation	BOD Provided	BOD Complete	Pending	Review comments in reference of OPR
1.02	Planning, Design	Develop draft commissioning plan outlining processes, roles and responsibilities, and deliverables and schedule. Final pending contractor selection and coordination.	Upon award	Mid-DD / 100% CD	Pending	Draft Cx Plan Framework
1.03	Design	Review Design Documents at key milestones w/ backcheck	Design Documents	SD / DD / Late-CD / Bid	Pending	Review comments in reference of OPR
1.04	Planning, Design & Pre-Con	Meeting Attendance and Support	Meeting Scheduled	As Req.	Pending	Meeting minutes, Action items & support
1.05	Design	Controls Integration (Design) Meeting	Control Drawings & Specs.	Early CD at latest	Pending	Review comments with facilities staff

1.06	Design	Commissioning Specifications	Design Documents	Mid-DD	Pending	General, Electrical and BECx Specifications
2.01	Pre-Construction	Conduct commissioning kickoff meeting to review commissioning process and plan to key stakeholders including trades	Trade partner mobilization	Pre-Con into Early Construction	Pending	Agenda & action item follow-up
2.02	Pre-Construction	Provide coordinated construction Cx Plan	Construction Schedule	Pre-Con into Early Construction	Pending	"Living" Cx Plan
3.00	Construction	Review and provide commissioning related comments on selected equipment and system submittals including detailed controls review	Submittals	Early Construction	Pending	Review comments provided to EOR and project team for incorporation
3.01	Construction	Attend project progress meetings to provide update regarding commissioning process	As req.	Throughout Construction	Pending	Agenda Items & action item follow-up
3.02	Construction	Attend scheduled construction progress meetings that include commissioning related topics; review minutes and provide comments	As req.	Throughout Construction	Pending	Agenda Items & action item follow-up
3.03	Construction	Field monitor installation of exterior enclosure components and witness testing by designated agency	Enclosure Install	Pending Construction	Pending	Field Observation Reports, Issues Log and Corrective Action support prior to final enclosure Cx report (Est. 4 Mobilizations)
3.04	Construction	Provide and review construction/pre-functional	Submittals Complete	Before MEP Rough-In	Pending	Construction Checklist forms

		checklists of selected systems and equipment				
3.05	Construction	Provide functional performance test procedures of selected systems and equipment	Submittals Complete	Early Construction	Pending	FPT scripts
3.06	Construction	Controls Pre-installation conference & pre-TAB meeting	Submittals Complete	Early Construction	Pending	Meeting Agenda, Graphics mockup support
3.07	Construction	Witness and provide commissioning related comments of air and water systems flushing, cleaning, and pressure testing reports of selected systems and equipment	System Install	Construction	Pending	Field Observation Reports & Issues log
3.08	Construction	Review Operations & Maintenance Data	O&M Manual Submitted	Mid-Construction	Pending	Issues Log & action item follow-up
3.09	Construction	Major equipment startup support and component checkout	Equipment integrated w/ controls	Late-Construction	Pending	Issues Log & action item follow-up
3.10	Construction	Perform Test and Balance Verification	TAB Report reviewed	Late-Construction	Pending	Site Observation Reports & Issues log
4.00	Acceptance	Direct and observe functional performance testing	TAB Complete	Late-Construction	Pending	Functional Performance Test Report and Issues Log
4.01	Acceptance	Perform comprehensive control graphics review	Controls Programming complete	Late-Construction	Pending	Screen Markups

4.02	Acceptance	Observe and verify owner training program	Functional Testing Complete	End-of-Construction	Pending	Training evaluation checklists, follow-up support
4.03	Acceptance	Facilitate Owner Transition Meeting	Training Complete	Prior-to-occupancy	Pending	Agenda and lessons learned discussion
4.04	Acceptance	Verify as-builts and final control sequences	Acceptance tasks complete	Prior-to-occupancy	Pending	Issues log including mark-ups as req.
5.00	Warranty	Provide Draft Commissioning Report	Owner Acceptance	90 days after occupancy	Pending	Draft Cx Report
5.01	Warranty	Complete seasonal and deferred testing	Opposite season	Winter or Summer	Pending	Issues log addendum and resolution support
5.02	Warranty	Final warranty review	9 months post-occupancy	Prior-to-warranty expiration	Pending	Final review of system performance with owner based on experience and trends

17 Integration with Project Schedule and LEED Deliverables

Commissioning activities are aligned with key project milestones to support efficient construction progress and meet LEED documentation requirements. The CxA will coordinate commissioning efforts to ensure seamless integration with the construction schedule, system turnover, and occupancy timeline.

Design & Construction Documentation Phase

Commissioning specifications and requirements are incorporated into bid packages and project documentation.

Early Construction Phase

Submittal reviews, installation inspections, and preliminary BAS integration verification occur before major system installations.

Equipment Startup & Initial Testing

Functional checklists and equipment startup verification are conducted prior to formal performance testing.

Functional Performance Testing & Issue Resolution

All commissioned systems undergo rigorous functional testing, with identified issues tracked and corrected before occupancy.

Owner Training & Documentation

Training and final commissioning documentation are completed in coordination with substantial completion.

LEED Submittals

Commissioning documentation, including the final report, test results, and supporting evidence for Enhanced Commissioning credits, is submitted to USGBC for certification review.

Appendices

Appendix A: Building Envelope Testing Matrix

Provided matrix is indicative of testing required if applicable to final design.

Table A: Building Envelope Testing Matrix

SID	Test	System	Test Required by ASTM 2813	Specification Section	Mockup Testing	In-Situ Field Testing	Required Sampling Rate			
							Location	Specified Quantity	First Install Quantity	Progress Testing Quantities (10,60,90%)
1	ASTM C1715 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems	Brick Masonry	No		Yes	Yes	TBD	2 tests at each masonry surface	1 at 30-36" masonry	1 at top out
2	ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems	Air and water barriers	Yes	07 1113 07 2726	Yes	Yes	TBD	1 test/500 sqft.	5	15 locations at 10%, 60% and at 90%
3	ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers	Air and water barriers	Yes	07 1113 07 2726	Yes	Yes	TBD	1 test per 500 sqft. at each substrate	2 tests for each substrate type	2 tests for each substrate type at 10%, 60% and 90%
4	ASTM C1193 Standard Guide for Use of Joint Sealants, Appendix X1-Method A, Field Applied Sealant Joint Hand Pull Tab	Joint Sealants	Yes	07 9200	Yes	Yes	TBD	1 test per 1000 lf. of installed sealant at each location where adjacent materials change	1 test per floor per elevation	2 tests at 10%, 60% and 90%

5	ASTM C1521: Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints	Joint Sealants		07 9200	No	Yes	TBD	1 test per 1000 lf. of installed sealant at each location where adjacent materials change	1 test per floor per elevation	minimum 2 tests at 10%, 60% and 90%
6	ASTM E783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors	Vertical Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
7	ASTM E1105: Water Penetration of Installed exterior Windows, Skylights, Doors and Curtain Walls	Vertical Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
8	AAMA 501.2: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems	Vertical/Sloped Exterior Glazing	Yes	08 4113	No	Yes	TBD	4 at each mobilization	2	4 locations at 10%, 60% and at 90%
9	ASTM C1153: Practice for Location of Wet Insulation in Roofing Insulation Using Infrared Imaging	Roofing	Yes		Yes	Yes	TBD	1 test after roof completion	N/A	N/A
10	ASTM D7877: Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes	Roofing	No		Yes	Yes	TBD	1 test after roof completion	N/A	N/A

11	ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	Building Air Leakage	No		Yes	Yes	TBD		TBD	
12	AAMA 511 Sub Sill Storefront Flood Testing.	Aluminum Framed Entrance and Storefront	No		Yes	Yes	TBD		TBD	
13	ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies	Air and water barriers	No		Yes	Yes	TBD		TBD	
14	<u>ASTM E966 – Field Measurement of Airborne Sound Attenuation of Building Facades and Facade Elements</u>	<u>Building Enclosure, Curtain Wall, Window, Roof</u>	<u>No</u>		<u>ASTM E90</u>	<u>Yes</u>	<u>TBD</u>		<u>TBD</u>	<u>1-3 locations at completion</u>

13.16 BUILDING ENCLOSURE
COMMISSIONING SPECIFICATION

SECTION 019119 - BUILDING ENCLOSURE COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to Section 01 91 13, General Commissioning Requirements

1.2 SUMMARY

- A. This section includes Enclosure Commissioning activities and supporting contractor responsibilities for Divisions 03, 04, 07, 08, 09 and 10 in supplement to Section 01 91 13, General Commissioning Requirements.

- 1. Definitions
- 2. Contractor's Responsibilities
- 3. BECxA's Responsibilities
- 4. Building Enclosure Testing Agency Responsibilities
- 5. Design Professional Responsibilities
- 6. Action Submittals
- 7. Informational Submittals
- 8. Field Performance Testing
- 9. Quality Assurance
- 10. Documentation, Non-Conformance, and Approval of Tests
- 11. Manpower and Equipment
- 12. Field Quality Control
- 13. Kick-off Meeting
- 14. Mock-ups
- 15. Construction Checklists
- 16. In-Place Enclosure Testing
- 17. Non-Conformance and Failed Testing
- 18. Key Testing Dependencies

- B. Related sections: ****TO BE COORDINATED WITH BCxP BASED ON DESIGN****

- 1. 03 30 00 – “Cast-In-Place Concrete”
- 2. 04 22 00 – “Concrete Unit Masonry”
- 3. 07 54 19 – “PVC Membrane Roofing”

4. 07 62 00 – “Sheet Metal Flashing and Trim”
5. 07 71 29 – “Manufactured Roof Expansion Joints”
6. 07 92 00 – “Joint Sealants”
7. 08 41 13 – “Aluminum-Framed Entrances and Storefronts”
8. 08 51 13 – “Aluminum Windows”
9. 08 62 00 – “Tubular Daylighting Devices”
10. 08 80 00 – “Glazing”
11. 08 91 19 – “Louvers and Vents”

- C. Building Enclosure Commissioning shall comply with ASTM E2947-16: “Standard Guide for Building Enclosure Commissioning” and meet or exceed relevant LEED requirements.

1.3 DEFINITIONS

- A. A/E: Design Professional/Engineer
- B. BECx: Building Enclosure (Envelope) Commissioning.
- C. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- E. BECxA: Building Enclosure Commissioning Authority.
- F. DP: Design Professional
- G. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- H. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
1. Evaluate performance deficiencies identified in test reports and, in collaboration with the entity responsible for system and equipment installation, recommend corrective action.
 2. Cooperate with the BECxA for resolution of issues recorded in the Issues Log.
 3. Attend commissioning team meetings as specified in Section 01 9113
 4. Integrate and coordinate commissioning process activities with construction schedule.
 5. Review and accept commissioning process test procedures provided by the BECxA.

6. Provide Construction Documents digitally and (BIM) Building Information Model.
- B. Contractor shall provide BECxA and Testing Agency with water, power, and any necessary equipment to gain access to perform the specified on-site testing, as noted in the project specification.
- C. Contractor shall notify BECxA of all required pre-installation conferences, coordination meetings, installation start-ups, inspections, and testing related to all systems to be commissioned under this specification.
 1. Notify BECxA of all meetings, conferences, tests, start-ups, and inspections as specified by DP under all sections referenced in the summary section of this specification a minimum of 2 weeks prior to scheduled date of event.

1.5 BECxA's RESPONSIBILITIES

- A. Organize and lead the commissioning team in relevant activities.
- B. Provide commissioning plan.
- C. Convene commissioning team meetings.
- D. Participate in pre-installation meetings with Design Professional, Owner, Contractor, Subcontractors and Manufacturer Representatives.
- E. Provide Project-specific commissioning process test procedures.
- F. Witness building envelope system installations, assemblies, equipment.
- G. Prepare and maintain the Issues Log.
- H. Verify the installation of the building envelope systems through testing activities using random sampling. The sampling rate per building envelope system may vary based on the OPR and Commissioning Plan. Verification will include, but is not limited to, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the project requirements, the BECxA will report the failure in the Issues Log.
- I. Compile test data, inspection reports, and certificates; include them in the final commissioning report.

1.6 BUILDING ENCLOSURE TESTING AGENCY RESPONSIBILITIES

- A. Submit a written report of each test, inspection, and similar quality-assurance service to Commissioning Authority. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- B. Any testing failures or observed deviations from the Contract Documents should be reported to BECxA, Contractor and Design Professional immediately.
- C. All formal testing reports are to be submitted to BECxA no more than 1 week following completion of testing.
- D. Testing Agency shall copy BECxA on all required inspections and testing reports related to all systems to be commissioned under this specification.
 1. Provide reports from all tests as specified by DP under all sections referenced this specification.

1.7 DESIGN PROFESSIONAL RESPONSIBILITIES

- A. Document the design intent of the systems.
- B. Review, respond and incorporate pertinent building enclosure drawing review comments.
- C. Review and incorporate building enclosure functional performance test herein into the construction documents.
- D. Attend the Preconstruction BECx Conference and BECx meetings on request.
- E. Attend preconstruction and construction-phase coordination meetings.
- F. Participate in Pre-construction, Mock-Up, and Field-testing coordination meetings as required.
- G. Provide recommendations for resolving items.
- H. Provide input for final commissioning documentation.
- I. Review and comment on BECxA review comments, reports and/or issues log.

1.8 ACTION SUBMITTALS

- A. Enclosure Testing Plan - BE Testing Agency in collaboration with the BECxA will develop a specific testing program for the building enclosure. The program shall include a copy of the test procedures to be provided to the Owner's Representative, Design Professional and Contractor who will review the program prior to testing. Responsible personnel, procedures, instructions, tests, records, and forms to be used to carry out the BECxA's and Testing Agency's building envelope testing and its quality-assurance and quality-control responsibilities will also be included.
 - 1. Testing and Identification: In the enclosure testing plan, a comprehensive schedule or matrix of work requiring testing or inspection will be included, covering:
 - a. Test Identification: name of test, building envelope system being tested, the sample rate for each test and if mock-ups for each test are required.
 - b. Party responsible: contact information for primary individuals from each party responsible for building envelope testing.
 - c. Construction Scheduling: estimated dates and duration of testing for each test. Indicate when testing should occur within the sequence of the construction schedule.

1.9 INFORMATIONAL SUBMITTALS

- A. Provide the BECxA a copy of all submittals for the Building Enclosure Systems to be commissioned. Relevant systems listed in above SUMMARY section.
- B. Submittals included:
 - 1. Product data
 - 2. Shop drawings
 - 3. Performance documentation including thermal, solar and dewpoint analysis as required.
- C. The BECxA shall review submittal concurrently with the Design Professional. Review comments will be included in addition to the Design Professional's formal review and response back to the GC.

- D. At the end of every testing effort, a field quality-control report will be issued to be included as part of a comprehensive final report provided at project completion.

1.10 FIELD PERFORMANCE TESTING

- A. This applies to testing for system performance and diagnostic purposes.
- B. The BE Testing Agency with BECxA oversight shall perform all enclosure testing as stipulated within this specification under contract to the owner. The GC shall be responsible for accommodating and supporting the execution of all enclosure testing.
- C. Objectives and Scope
 - 1. The objective of testing is to demonstrate that building enclosure systems and the interface between systems perform according to specific performance requirements for watertightness, air tightness, and thermal performance.
- D. Enclosure Testing Plan
 - 1. The BECxA will develop and provide a specific testing plan in consultation with the BE Testing Agency and DP based on the specific performance expectations for the building enclosure. The BECxA provides a copy of the test procedures to the Design Professional and Owner's Representative who will review the plan prior to testing.
- E. Coordination and Scheduling
 - 1. Notice of Readiness: The contractor is responsible for providing sufficient notice to the BECxA regarding the installation schedule for relevant components and systems.
 - 2. Scheduling: The BECxA will schedule tests after written notification from the GC and relevant installers.
 - 3. Time Allowance: The GC will allow adequate time to complete testing.
 - 4. Testing Responsibility: The Testing Agency with support of the installers or manufacturer representatives where required will perform the tests as witnessed by the BECxA.
 - 5. Testing Readiness: In general, testing will not be scheduled until all submittals are approved except for preconstruction testing as outlined within this specification. Testing shall also not be performed without documented confirmation of readiness through completed construction checklists.
 - 6. Test Failure: Failed tests will be re-tested with possible additional testing at the discretion of the BECxA and Owner. See Non-Conformance and Failed Testing section of this specification.
 - 7. Problem Solving: The BECxA and Testing Agency will recommend solutions if problems are found and communicate these to the Owner, the DP and GC; however, the burden of responsibility to solve, correct and re-test is on the GC

1.11 QUALITY ASSURANCE

- A. Standards and Practices: BECxA and Testing Agency and their personnel will be informed by the following guidelines and standards.
 - 1. ASTM E2813 – Standard Practice for Building Enclosure Commissioning.
 - 2. ASTM E2947 – Standard Guide for Building Enclosure Commissioning.

3. NIBS Guideline 3-2012 – Building Enclosure Commissioning Process BECx.
 4. ASHRAE Guideline 0-2005: The Commissioning Process.
- B. Any additional testing beyond what is noted in the above documents and in this specification will be reviewed by the BECx, Testing Agency, DP, Contractor and Owner for acceptance before the test is performed.
- 1.12 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS
- A. The BECx will document the testing to include a summary of the industry standard testing procedure, photos, the results of each test (pass/fail), photos, and retesting requirements if applicable.
 - B. In the event of a test completed with deficiencies or failure, an issues log will be generated to document the original issue, capture correspondence concerning issue resolution, and the corrective action implemented leading to a successful retest.

PART 2 - PRODUCTS

2.1 MANPOWER AND EQUIPMENT

- A. The GC is responsible to provide the following:
 1. Adequate power and water to each test location.
 2. Access to the outside and inside of the building at each test location for personnel, which may include installer, Architect, Owner, commissioning team, and equipment. No interior finishes will be present at test area.
 3. Access shall include providing lifts and/or platforms as necessary to enable the BECx to perform the required testing.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Testing Agency: A qualified testing agency shall be engaged to perform tests and inspections.
- B. Manufacturer's Technical/Field Representative: Where required to obtain a manufacturer's warranty, engage a factory-authorized service representative to witness testing and inspect components, assemblies, and equipment installations, including connections.
- C. Any additional testing required because of failure of the tested sample to meet specifications shall be paid for by the Contractor including time and materials rates for Owner, DP, and BECx to witness test results.
- D. Testing Agency will perform all specified and requested tests in the presence of the BECx, DP, Owner and Contractor, if available.
- E. Testing Agency and BECx will provide a testing report outlining procedures, dates, and issues corrected with photographic evidence of the testing to the Owner and DP for review.

3.2 KICK-OFF MEETING

- A. The BECx will schedule an enclosure commissioning kickoff meeting before construction of the building enclosure commences, at a time convenient to Owner, Construction Professional, and Architects. Allow for the meeting to be held at the project site or another convenient location.

The BECxA will conduct the meeting to review commissioning responsibilities and personnel assignments.

- B. Attendees: Authorized representatives of Owner, BECxA, Architect / Engineer, Construction Professional and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to building enclosure commissioning.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Commissioning plan
 - 2. Tentative construction schedule
 - 3. Critical work sequencing and long-lead items
 - 4. Designation of key personnel and their duties
 - 5. Procedures for filling-out building enclosure checklists
 - 6. Procedures for testing and inspection
 - 7. Submittal procedures

3.3 MOCK-UPS

- A. Refer to the Contract Documents, Drawings, and Specifications for mock-up requirements.
- B. Submittals
 - 1. Provide shop drawings for all mock-ups. Shop drawings shall include overall plans, elevations, sections, and enlarged details depicting all enclosure components, interfaces, transitions, and accessories included within the mock-up.
- C. Review and Testing
 - 1. Construct mock-ups in accordance with the Contract Documents and applicable specification sections.
 - 2. Field mock-ups shall be reviewed by the Owner, Architect, Building Enclosure Commissioning Provider (BECxP), and other parties identified in the Contract Documents prior to commencement of associated Work.
 - 3. Perform water penetration testing of mock-ups in accordance with the requirements of the Contract Documents. Unless otherwise specified, conduct one test prior to installation of veneer or exterior cladding and one test following completion of the veneer or exterior cladding for each unique enclosure assembly type.
 - 4. Where acoustical performance is identified as a project requirement, perform acoustical testing of representative enclosure mock-ups or completed enclosure assemblies in accordance with ASTM E966 or other specified standards. Testing locations, timing, and acceptance criteria shall be as defined in the Contract Documents and Owner's Project Requirements.
 - 5. Correct deficiencies identified during mock-up reviews or testing and repeat testing as required until acceptable performance is demonstrated.

6. Maintain approved mock-ups in place and protected throughout construction of the building systems they represent. Mock-ups shall remain accessible for comparison with completed Work unless otherwise approved by the Owner and Architect.

D. Pre-Install Meetings

1. Pre-install meetings will be held which cover all enclosure systems.
2. Each enclosure system will be included in at least one meeting.
3. The meetings will be divided into parts of the building such as below grade, wall and roofs.
4. Each meeting will include all installers that have work that is included in that part of the building.

3.4 CONSTRUCTION CHECKLISTS

- A. The BECxA shall provide enclosure construction checklists. These checklists will be developed based upon the contract documents, approved submittals and manufacturer's recommendations.
- B. The installing contractors shall complete the construction checklists throughout construction. The checklists shall be executed in a timely manner and submitted to the BECxA for review and sample verification.

3.5 IN-PLACE ENCLOSURE TESTING

- A. This applies to testing of systems for in-place work on the building. The Testing Agency under direction of the BECxA shall conduct relevant testing specified herein with required support from the GC.
- B. Applicable testing includes:
 1. JOINT SEALANTS (CONTRACTOR TESTING)
 - a. Testing Method: Test joint sealants according to ASTM C 1193 – “Guide for Use of Joint Sealants - Appendix X1, Method A, Field-Applied Sealant Joint Hand Pull Tab”.
 - b. Schedule: In-Progress Construction
 - c. Note that sealant test samples should be conducted per sealant type and per each sealant joint's substrates.
 - d. Note all tests should be conducted only after the sealant has been allowed to properly cure, per the manufacturer's recommendations.
 2. AIR/VAPOR BARRIER AND ENCLOSURE COATINGS (CONTRACTOR TESTING)
 - a. Testing Method: ASTM D4541 – “Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers”. Contractor shall test relevant coating adhesion to specified substrates.
 - b. Schedule: In-Progress Construction
 - c. Testing shall occur prior to installation of exterior finishes.
 - d. Where adhesion failure has occurred, the contractor shall properly repair the failed area.

- e. Failures in adhesion of the fluid-applied air barriers will result in additional test samples being taken by the Testing Agency.
 - 3. WHOLE BUILDING AIR BARRIER TEST WITH THERMOGRAPHIC DIAGNOSTICS
 - a. Testing Method: ASTM E779 – “Standard Test Method for Determining Air Leakage Rate by Fan Pressurization” and ASTM E1827 – “Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door”
 - b. Schedule: Late construction, Building Enclosure is complete with all components installed and sealed, but ideally prior to final finishes to facilitate identification and remedy of issues identified.
 - c. THERMOGRAPHIC DIAGNOSTICS
 - 1) Testing Method: ASTM E1186 – “Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems” and ISO 6781 – “Thermal Insulation – Qualitative detection of thermal irregularities in building envelopes – Infrared method”
 - 2) Accurate thermography will require a significant temperature difference between the interior and exterior, typically greater than 10°F and appropriate weather conditions accounting for solar radiation, wind and precipitation.
 - 3) The systematic scan will focus on areas prone to air leakages such as windows, doors, joints and penetrations.
 - 4. ASTM AIR & WATER TESTING
 - a. Testing method: ASTM E783 – “Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors” and ASTM E1105 – “Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference”
 - b. Schedule: First-of-a-kind installation, In-progress construction
 - c. ASTM E783 & E1105 Air & Water Testing shall be performed on specimens up to 10-feet x 10-feet (or 100 square feet) in surface area.
 - 5. AAMA WATER SPRAY TESTING
 - a. Testing method: AAMA 501.2 – “Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems”
 - b. Schedule: Late construction
 - c. Water Spray Testing shall be performed up to 300 linear feet.
- 3.6 NON-CONFORMANCE AND FAILED TESTING
- A. Non-conformance deficiencies identified during Periodic Site Visits or Building Enclosure Performance Testing shall be resolved as follows:
 - 1. The BECxA shall produce site visit reports during routine visits throughout construction.
 - 2. Those reports shall include an issues log that shall be submitted to the GC. The issues log shall be in electronic form in an agreeable format that shall be confirmed by the Commissioning Team at the kickoff meeting.

3. The GC shall be responsible for timely response to all BECx deficiencies in electronic form with photographs supporting each response/resolution. The BECx shall be solely responsible for closing BECx issues with approval by Owner.
 4. Corrections of identified minor deficiencies may be made during the review at the discretion of the BECx. In such cases the deficiency and associated resolution will be documented in the issues log.
- B. For enclosure testing, as testing progresses and a deficiency is identified, the BECx will discuss the issue with the GC for follow-up and resolution.
1. When there is no dispute with respect to the deficiency and the GC accepts responsibility to correct it:
 - a. The BECx shall document the deficiency and the GC's response. A copy/email of the deficiency shall be generated and provided to the GC. The applicable subcontractor corrects the deficiency, responds to the deficiency in the Commissioning Issues Log certifying that the issue is resolved and /or the product, material or assembly is ready to be retested and notifies the Project Team.
 2. If there is a dispute about a deficiency:
 - a. The deficiency shall be documented as a BECx issue and the GC will be notified. The GC will track this issue under the construction contract dispute resolution provisions.
 - b. Final acceptance authority is with the Owner or Design Professional.
- C. Testing Failures, as defined in each Building Enclosure Technical Sections (Divisions 03-13) and/or within this specification section. In event of test failure, the GC shall provide the Owner with the following:
1. Installer/Manufacturer's response in writing as to the cause of the failure and proposed resolution.
 2. Installer/Manufacturer shall implement their proposed resolution on a representative sample of the product.
 3. The GC coordinates and schedules re-testing by the BECx that is reimbursed by the GC. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner, the remedial action taken will be implemented on a project-wide basis where applicable.
 4. The Owner will determine whether a replacement of all identical units is required or if a repair is acceptable.
 5. Upon acceptance, the responsible party shall replace or repair all identical items at their expense and shall extend the warranty accordingly.
 6. Systemic or frequent failures may result in additional testing beyond originally identified to verify performance.
 7. Based on the type of failure and the rate of frequency, the number of additional tests will be negotiated between the BECx, the Owner, and the GC.
- D. Cost of Retesting and/or Additional Testing:
1. GC is responsible for the cost of all re-tests and additional testing and compensation of time for BECx and DP related to all additional work necessitated by re-testing or

additional testing of specimens if contractor or subcontractors are responsible for the deficiency. This cost shall be offset through the Owner via back-charge, not through a direct charge to the GC. If not responsible, cost recoveries for retesting will be negotiated with GC. Typically, one (1) new specimen in addition to the one (1) failed specimen will be tested as part of the retesting protocol. If additional failures are present, the Owner and BECxA may increase the retesting to up to 2x locations for the second failure and unlimited locations for more than 3 failed tests.

3.7 KEY TESTING DEPENDENCIES

A. ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1. All testing shall occur after storefront system is weather-tight but prior to installation of interior finishes allowing for adequate viewing of potential air and water leakage from both the interior and exterior of the installation.

B. GLAZED ALUMINUM CURTAINWALLS

1. All testing shall occur after curtainwall system is weather-tight but prior to installation of interior finishes allowing for adequate viewing of potential air and water leakage from both the interior and exterior of the installation.
2. If applicable, test structural sealant according to recommendations in ASTM C1401 – “Destructive Test Method A, ‘Hand Pull Tab (Destructive),’ Appendix X2”.

C. ALUMINUM WINDOWS

1. All testing shall occur after the window area to be tested is weather-tight but prior to installation of interior finishes, allowing for adequate viewing of potential air and water leakage from both the interior and exterior of the installation.

END OF SECTION 019119

ADDENDUM**02**

TO: State of Illinois Capital Development Board
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PROJECT: Drug Discovery and Cancer Research Pavilion
For University of Illinois Chicago
CDB Project #: 830-030-167

OWNER: State of Illinois Capital Development Board

DATE: 09/02/2026

H&R
PROJECT
NO. 16141

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1. This Addendum defines revisions to the Bridging Documents.
 2. This Addendum may include revised or added pages, documents, and/or Drawings that are to be inserted in the correct sequence in the Bridging Documents.
 3. This Addendum shall be acknowledged on the Bid Form and incorporated into the proposed Contract Sum and Contract Time.
 4. When text pages are reissued, modifications are indicated as follows: Revised or added text is shown in **bold underline** face type. Deleted text is shown as ~~strike through~~.
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DESCRIPTION

This addendum reflects the following categories of revisions:

Item 1 Updates to the No Deviations List to add UIC's door hardware requirements.

MATERIALS ATTACHED

The following pages are updated or expanded upon:

N/A

The following sections are updated:

13.10 NO DEVIATIONS LIST

The following sections are being issued for the first time:

N/A

PREPARED BY

Holabird & Root, LLC
Anne Strane AIA

No.	Category	Item	No Deviations Permitted from these Acceptable Products and/or Manufacturers	Reason
ND-1	Mechanical	Building Automation System	Alerton, Distech (BAS Platform: Tridium Niagara N4)	UIC's Building Automation System platform is standardized on Tridium Niagara N4, with over 95% of campus systems using this front-end. To maintain seamless campus integration, alarm management, trend logging, and maintenance continuity, DDCRP must use the same platform. Alerton and Distech are the only campus-approved Tridium-based control systems.
ND-2	Mechanical	Exhaust Fans	Twin City, Strobic	Twin City and Strobic are used campus-wide for high-plume laboratory exhaust systems and are standard for general exhaust. UIC requires consistency in parts, motor assemblies, and controls integration.
ND-3	Mechanical	Venturi Valves	Triatek	UIC has standardized Triatek venturi valves for laboratory pressurization control. Mixing manufacturers creates compatibility issues with room-level controls, calibration procedures, and maintenance.
ND-4	Mechanical	Chilled Beams	Semco	Semco is widely used on campus and provides consistent beam performance, integration with room controls, and maintains campus standardization for parts and service.
ND-5	Mechanical	Control Valves & Dampers	Belimo	UIC requires Belimo for all control valves and actuators due to its proven reliability, support availability, and BAS compatibility.
ND-6	Electrical	Electrical Transformers, Switchgear & Panels	Square D, ABB	UIC Facilities uses these manufacturers throughout campus, maintaining uniformity in switchgear parts, breakers, fuses, and safety protocols.
ND-7	Electrical	Variable Frequency Drives	ABB	UIC has standardized on ABB VFDs, simplifying programming, spare parts, and maintenance.
ND-8	Electrical	Fire Alarm System	Notifier	UIC's entire campus fire alarm infrastructure is standardized on Notifier. Integration with the campus central monitoring system requires maintaining the same platform.
ND-9	Technology, Audio/Visual, & Security	Telecommunications Pathways	MaxCell Innerduct	UIC has standardized MaxCell Innerduct for flexible, multi-cell fabric innerduct within their underground utility conduit pathways to support fiber optic cabling installations.

No.	Category	Item	No Deviations Permitted from these Acceptable Products and/or Manufacturers	Reason
ND-10	Technology, Audio/Visual, & Security	Telecommunications Fiber Enclosures	Panduit, Ortronics	Ortronics and Panduit is used campus-wide within all of UIC's datacenters, nodes, IDFs and FDFs as the preferred manufacturers for termination of the fiber optic cabling infrastructure. Use of these products ensures consistency, compatibility and interoperability with established fiber optic cabling infrastructure standards. Ortronics and Panduit enclosures also reduce risk of schedule and supply chain issues the University has experienced previously.
ND-11	Technology, Audio/Visual, & Security	Access Control System	Lenel OnGuard	UIC's entire campus access control system is standardized on Lenel OnGuard. Integration with the campus access control and alarm monitoring system requires maintaining the same platform.
ND-12	Technology, Audio/Visual, & Security	Local Door Alarms	Designed Security, Inc.	UIC has standardized Designed Security, Inc. for integrating local door alarms into the access control system.
ND-13	Technology, Audio/Visual, & Security	Access Control Power Supplies & Enclosures	Altronix	UIC has standardized Altronix for housing and integration of door access controllers and power supplies for integration into the access control system headend. Use of Altronix products has ensured reliability, compatibility and configurability for their access control system.
ND-14	Technology, Audio/Visual, & Security	Access Control Power Supply Batteries	PowerSonic	UIC has standardized PowerSonic for use within their power supply panels to support backup power for their access control system headend. Use of PowerSonic products has ensured reliability and compatibility with their access control systems.
ND-15	Technology, Audio/Visual, & Security	Access Control Readers	HID	UIC's has standardized HID credential readers as part of their existing access control platform to ensure compatibility, consistency in credentials and streamlined system administration. Use of HID readers maintains interoperability with the current access control system headend, reduces integration risk and supports long-term operational efficiency.

No.	Category	Item	No Deviations Permitted from these Acceptable Products and/or Manufacturers	Reason
ND-16	Technology, Audio/Visual, & Security	Video Management System	Genetec	UIC's entire campus is standardized on Genetec as its enterprise video management platform to ensure seamless integration with its existing security infrastructure, consistent system operation, and centralized monitoring. Use of Genetec ensures continued system-wide interoperability, reliable performance, unified management across all cameras and continuity with established operational workflows.
ND-17	Technology, Audio/Visual, & Security	Video Surveillance Cameras	Axis Communications	UIC's entire campus is standardized on Axis cameras as its preferred hardware platform to ensure compatibility with the existing video management platform, consistent image quality and streamlined device management. Use of Axis cameras ensures reliable performance, full feature interoperability with enterprise VMS, long-term product support and continuity with establish security operations and maintenance practices.
ND-18	Technology, Audio/Visual, & Security	Emergency Telephone Bollards (Owner Furnished / Contractor Installed)	Startel System-Code Blue; ETU Bollard: CB1-S	UIC has standardized on Code Blue CB1-S emergency telephone bollards for campus-wide emergency communication. These units integrate directly with the University's existing Startel emergency communication system used by UIC Public Safety for monitoring and dispatch. Maintaining the Code Blue platform ensures consistent operation, reliable connectivity with the central monitoring system, standardized maintenance procedures, and compatibility with existing campus emergency communication infrastructure. Introducing alternate manufacturers would create interoperability challenges, increase maintenance complexity, and reduce consistency with the campus emergency response network.

No.	Category	Item	No Deviations Permitted from these Acceptable Products and/or Manufacturers	Reason
ND-19	Technology, Audio/Visual, & Security	Interior Emergency Telephones (Owner Furnished / Contractor Installed)	Viking Electronics ETU: Viking Speaker Phone SP613-E1600A	UIC has standardized Viking Electronics SP613 speakerphones for interior emergency telephone units that connect to the campus Startel emergency communication system. These devices have been specifically configured in coordination with Viking Electronics to meet UIC Public Safety operational requirements and to ensure full compatibility with the existing emergency phone infrastructure. Use of this standardized device ensures reliable communication, consistent system configuration, simplified maintenance, and seamless integration with the campus emergency response system.
ND-20	Technology, Audio/Visual, & Security	Elevator Communication System (Owner Furnished / Contractor Installed)	Rath/Janus Elevator Voice and Messaging System: Rath SmartView 2100_SVFCOMP	UIC has standardized on the Rath / Janus SmartView system for elevator emergency communication to ensure compatibility with the campus Startel emergency communication system and compliance with current elevator code requirements for two-way voice and visual communication. The Rath SmartView platform has been coordinated with UIC Public Safety and Technology Solutions to support texting and video communication capabilities required for accessibility and emergency response. Maintaining this standardized system ensures consistent monitoring, reliable operation, and integration with the University's centralized emergency communication infrastructure.
ND-21	<u>Door Hardware</u>	<u>Mortise Locks</u>	<u>ASSA/ Corbin Russwin - Entrance Function: ML2051-CSM-626; Storeroom Function: ML2057-CSM-626; Classroom Function: ML2055-CSM-626</u>	<u>UIC's Lock Shop has standardized lock door hardware requirements to follow UIH standards.</u>

No.	Category	Item	No Deviations Permitted from these Acceptable Products and/or Manufacturers	Reason
<u>ND-22</u>	<u>Door Hardware</u>	<u>Lock Cylinder & Cylinder Keyway</u>	<u>Medeco Security Locks with Medeco Biaxial Patented Keyway</u>	<u>UIC's Lock Shop has standardized lock door hardware requirements to follow UIH standards.</u>
<u>ND-23</u>	<u>Door Hardware</u>	<u>Exit Devices</u>	<u>Allegion/Von Duprin - Regular Rim Device: 99L; Fire Rated Rim Device: 99L-F; Vertical Rod Rim Device: 9927L; Concealed Vertical Rod Device: 9947L; Mortise Device: 9975L; Rim Electric Latch Retraction: QEL99L</u>	<u>UIC's Lock Shop has standardized lock door hardware requirements to follow UIH standards.</u>
<u>ND-24</u>	<u>Door Hardware</u>	<u>Electromagnetic Locks</u>	<u>SDC</u>	<u>UIC's Lock Shop has standardized lock door hardware requirements to follow UIH standards.</u>
<u>ND-25</u>	<u>Door Hardware</u>	<u>Electric Strikes</u>	<u>ASSA - HES 1500, 1600, 4500/Folger Adam Co.</u>	<u>UIC's Lock Shop has standardized lock door hardware requirements to follow UIH standards.</u>