

SECTION 011000 - SUMMARY

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Identification:

1. Project #: <##-###>
2. Project Name: <Official Project Name>
3. Project Location: <Street Address>

B. Owner: University of Maryland, Baltimore.

1. Owner Representative: <Insert Name, Title>
2. Contact Information: <email address>, <phone number>

C. Design Professional (A/E):

1. Design Firm:
2. Firm Representative
3. Contact Information

D. Construction Manager/ General Contractor

1. Firm Name
2. Company Representative
3. Contact Information

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. <Insert a brief description of Project indicating the size, code classification for occupancy and construction type, and general description of major building assemblies> and other Work indicated in the Contract Documents.

- B. Contract Documents, dated <INSERT DATE INDICATED IN THE CONTRACT DOCUMENTS>, were prepared for the Project by the Prime Design Consultant and all subconsultants as named in the Drawings and Specifications, including cover/title page.

- C. Requirements shown on the Drawings and specified herein are complementary; where conflicts occur, the more stringent requirement, as determined by the University and outlined in the General Conditions of the contract, shall govern.
- D. Detailed site controls, temporary facilities, and protection requirements are specified in
 - 1. 015000 – TEMPORARY FACILITIES AND CONTROLS
 - 2. 017300 – EXECUTION.

<DELETE NEXT PARAGRAPH IF PROJECT HAS AN A/E>

- E. Requirements of this Section and the other Division 01 Sections apply to the Work regardless of whether the project includes a Prime Design Consultant, Architect/Engineer of Record, or other design professional during construction

1.3 WORK PERFORMED UNDER SEPARATE CONTRACTS

- A. The University may perform or contract for additional work at the Project site under separate contracts.
- B. Separate work may include work performed either:
 - 1. Prior to commencement of the Work under this Contract, and/or
 - 2. Concurrently with the Work under this Contract
 - 3. Following the work under this contract
- C. Cooperate fully with separate contractors and the University so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- D. The existence of multiple contractors, occupied facilities, or ongoing University operations shall not be grounds for additional compensation or schedule relief, except as expressly provided for in the Contract Documents.

<APPLICABLE ONLY WHEN FUTURE CONTRACTS WILL BE AWARDED>

1.4 FUTURE WORK

- A. Future Contract: The University has awarded a separate contract for additional work to be performed at the site following Substantial Completion. Completion of that work depends on successful completion of preparatory work under this Contract. The Contract for future work includes the following:

Edit additionally if contract is not yet awarded but scope of work is known.

- 1. Contract: A separate contract has been awarded to <INSERT NAME OF SEPARATE CONTRACTOR> to <INSERT A BRIEF DESCRIPTION OF WORK PERFORMED UNDER THE SEPARATE CONTRACT>

1.5 PHASED CONSTRUCTION (IF APPLICABLE)

- A. The Work may be conducted in phases as indicated in the Contract Documents.
- B. The Work will be conducted in <INSERT NUMBER OF PHASES> phases.
 - 1. Phase <INSERT PHASE NUMBER>: <BRIEFLY DESCRIBE WORK OF THIS PHASE.> Work of this phase shall be substantially complete, ready for occupancy within <INSERT TIME> of start of construction.
 - 2. <CONTINUE LIST AND DESCRIPTION FOR EACH PHASE>
- C. Where phased construction is required:
 - 1. Each phase shall be substantially complete as indicated in the Contract Documents.
 - 2. Based on project schedule, each phase may be scheduled separately for substantial completion. Substantial Completion of one phase does not affect the status of any other phase.

1.6 MULTIPLE WORK PACKAGES (IF APPLICABLE)

- A. The University may issue the Work in multiple work packages to accommodate early release work, phased work, etc. Multiple work packages differ from phased construction.
- B. The Work will be conducted in <INSERT NUMBER OF PACKAGES> packages.
 - 1. Phase <INSERT PACKAGE NUMBER>: <BRIEFLY DESCRIBE WORK OF THIS PACKAGE.> Work of this phase shall be substantially complete, ready for occupancy within <INSERT TIME> of start of construction.
 - 2. <CONTINUE LIST AND DESCRIPTION FOR EACH PACKAGE>
- C. Contractor shall coordinate the Work under this Contract with work performed under other work packages and shall comply with all coordination requirements of the Contract Documents.

1.7 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the University's right to perform work or to retain other contractors on portions of the Project.
- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
 - 1. University Occupancy: Allow for University occupancy and use by the public.
 - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the University, the University's employees, and emergency vehicles at all

times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- C. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.8 OCCUPANCY REQUIREMENTS

<CHOOSE ONE AND EDIT FOR PARTICULAR PROJECT>

- A. Full University Occupancy: The University will occupy the site and existing building during the entire construction period. Cooperate with the University during construction operations to minimize conflicts and facilitate University usage. Perform the Work so as not to interfere with the University's operations.

<INCLUDE ALL REQUIREMENTS NECESSARY FOR WORK DURING OFF HOURS>.

- 1.9 Partial University Occupancy: The University reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

- 1. The University will conduct a punchout of the area to be occupied and prepare a punch list. If it is determined that the work is substantially complete, the University will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to University occupancy. A blank Certificate of Substantial completion is included at the end of this section.
- 2. Prior to partial University occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the University will operate and maintain mechanical and electrical systems serving occupied portions of the building.
- 3. Upon occupancy, the University will assume responsibility for maintenance and custodial service for occupied portions of the building.

1.10 UNIVERSITY OCCUPANCY

- A. The University may occupy all or portions of the Project site during construction.
- B. Contractor shall:
 - 1. Coordinate construction activities with University operations.
 - 2. Maintain safe access for occupants and the public.
 - 3. Minimize disruption to University activities.
- C. Early occupancy of completed portions of the Work shall not constitute acceptance of the Work.

<APPLICABLE ONLY FOR PROJECTS USING PRE-PURCHASED EQUIPMENT>

1.11 PRODUCTS ORDERED IN ADVANCE

- A. General: The University has negotiated purchase orders with suppliers of material and equipment to be incorporated into the Work. The Contractor shall make all arrangements to schedule and receive all such material and equipment from the suppliers. Costs for receiving, handling, storage, protection and installation shall be included in the Contract Sum.
1. The Contractor's responsibilities are the same as if the Contractor negotiated the purchase orders. If requested by the University, the Contractor shall renegotiate purchase and execute final purchase order agreements. A "Schedule of Products Ordered in Advance" is included at the end of this Section.

<INCLUDE SCHEDULE OF PRODUCTS ORDERED IN ADVANCE AS NECESSARY>

<APPLICABLE ONLY WHEN UNIVERSITY WILL PROVIDE CONTRACTOR WITH MATERIALS TO INSTALL>

1.12 UNIVERSITY-FURNISHED PRODUCTS

- A. The University will furnish **<INSERT A BRIEF DESCRIPTION OF UNIVERSITY-FURNISHED PRODUCTS>**. The Work includes providing support systems to receive University's equipment, and mechanical and electrical connections.
1. The University will arrange for and deliver necessary shop drawings, product data, O&M Manuals, warranties and samples to the Contractor for review and inclusion in the operation and maintenance manual.
 2. The University will arrange and pay for delivery of University furnished items according to the Contractor's Construction Schedule.
 3. Following delivery, the University will inspect items delivered for damage.
 4. If University furnished items are damaged, defective, or missing, the University will arrange for replacement.
 5. The University will arrange for manufacturer's field services in accordance with the Contractor's construction schedule.
 6. The Contractor shall designate delivery dates of University furnished items in the Contractor's Construction Schedule.
 7. The Contractor shall review shop drawings, product data, and samples and return them to the University noting discrepancies or problems anticipated in use of the product.
 8. The Contractor is responsible for receiving, unloading, and handling University furnished items at the site.
 9. The Contractor is responsible for protecting University furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations or failure to adequately protect the item.
 10. A schedule of University finished products' is included at the end of this section.

1.13 PROTECTION OF EXISTING CONSTRUCTION AND FURNISHINGS

- A. The Contractor shall take all necessary precautions to protect the University's property and furnishings. The Contractor shall promptly remedy damage and loss to the University's property caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

PART 2 - PRODUCTS (Not Used)

<INCLUDE SCHEDULE OF PRODUCTS ORDERED IN ADVANCE AS NECESSARY>

<INCLUDE SCHEDULE OF UNIVERSITY FURNISHED PRODUCTS AS NECESSARY>

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012100 –ALLOWANCES

Latest Update: 8/6/2026

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PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances may include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Quantity allowances.
 - 4. Testing and inspecting allowances.

- 1.2 Upon completion of the Work covered by an allowance, the allowance shall be reconciled to the actual cost incurred. The Contract Sum shall be increased or decreased by Change Order, if appropriate, to reflect the difference between the allowance amount and the actual cost. Allowances must be reconciled and Change Order requested prior to submitting application for final payment.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise University of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the University to avoid delaying the Work.
- B. At University's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by University from the designated supplier.

1.4 ACTION SUBMITTALS

- A. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 ALLOWANCE USE SUBSTANTIATION REQUIRED

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

1.6 ALLOWANCE USAGE

- A. Allowance shall include cost to Contractor of specific products and materials ordered by University or selected by University or Architect under allowance and shall include [taxes,]freight[,] and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by University or selected by University or Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to University after installation has been completed and accepted.
 - 1. If requested by University or Architect, retain and prepare unused material for storage by University. Deliver unused material to University's storage space as directed.
- D. Disposition of Unused Materials: At the University's direction, unused materials purchased under an allowance shall be returned to the manufacturer or supplier for credit to the University where practical. Where return for credit is not economically feasible, or when directed by the University, prepare unused materials for storage and deliver to the University's designated storage location. The University may direct disposition of unused allowance materials at any time during the Contract period.

1.7 TESTING AND INSPECTING ALLOWANCES

<EDIT FOR PARTICULAR PROJECT>

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of testing and inspection services not specifically required by the Contract Documents are Contractor responsibilities and are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to University by Change Order.

- E. Contractor Responsibilities: Costs for incidental labor required to assist testing or inspection agencies, as well as costs associated with retesting resulting from failure of previous tests or inspections, are Contractor responsibilities and shall be included in the Contract Sum. Such costs shall not be charged against testing and inspecting allowances.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. University reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include the Contractor's or sub-contractors indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
 - 2. No change to the Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

<INSERT SCHEDULE OF PLANNED ALLOWANCES>

END OF SECTION 012100

SECTION 012200 – UNIT PRICES

Latest Update: 8/6/2026

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PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.

1.2 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit, and applicable taxes. Unit prices are applicable to both additions and deletions.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. The University reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the University's expense, by an independent surveyor acceptable to the Contractor.
- D. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 UNIT PRICE SCHEDULE

<INSERT SCHEDULE>

END OF SECTION

SECTION 012300 – ALTERNATES

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PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

1.2 POST-AWARD ALTERNATE NOTIFICATION

- A. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
 - 1. Include costs listed for each alternate, including costs of related coordination, modification, or adjustment in the bid.
 - 2. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- B. Execute accepted alternates under the same conditions as other Work of this Contract.

<DELETE IF PROJECT DOES NOT INCLUDE ALTERNATES>

- C. Schedule of Alternates is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

<INSERT SCHEDULE>

END OF SECTION

SECTION 012500 – SUBSTITUTION PROCEDURES

Latest Update: 8/6/2026

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PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after Contract Award.
- B. Substitution requests cannot be submitted as part of Shop Drawings, Product Data, or Sample Submittals. Inclusion of same in a does not constitute an acceptable or valid request for substitution, nor does approval of the submittal constitute approval. A formal Substitution Request must be submitted and approved.
- C. Nothing in this Section shall be construed to relieve the Contractor of responsibility for compatibility, coordination, or performance of approved substitutions in accordance with the Contract Documents.

1.2 EXCLUSIONS FROM SUBSTITUTION REQUIREMENTS

- A. The substitution requirements of this Section do not apply to the following:
 - 1. Substitutions requested during the bidding period and accepted by addendum prior to award of the contract, which are incorporated into the contract documents.
 - 2. Revisions to the contract documents initiated by the University, including changes directed by change order, Construction Change Directive, or other written directive.
 - 3. Specified options of products, materials, equipment, or construction methods explicitly included in the Contract Documents.
 - 4. Compliance with governing laws, codes, regulations, and orders issued by authorities having jurisdiction, provided such compliance does not alter the intent or performance requirements of the Contract Documents.

1.3 ACTION SUBMITTALS

- A. Substitution Request Submittal: The University will consider requests for substitution if received within 60 **<EDIT FOR PARTICULAR PROJECT>** days after issuance of Notice to Proceed. Requests received more than 60 **<EDIT FOR PARTICULAR PROJECT>** days after issuance of Notice to Proceed may be considered or rejected at the discretion of the University.
1. Substitution Request Form: Use form in the University's PMIS. Submit one request per form using the standard submittal process under 012500-Substitution Request [Submittal Name].
 2. Identify proposed Substitution. Include reference Specification Section and Drawings.
 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the University and other contractors that will be necessary to accommodate the proposed substitution.
 - c. Detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as performance, weight, size, durability, and visual effect.
 - d. Product Data, including drawings, descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Detailed comparison of Contractor's CPM Construction Schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time.
 - g. Cost information, including change related to the proposed substitution, if any, in the Contract Sum.
 - h. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - i. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of substitution to perform adequately.
 - j. Confirmation that substitute product warranty matches specified product warranty.
 - k. Sustainable design compliance, if applicable

1.4 UNIVERSITY’S ACTION

- A. University will review and take action on Substitution Requests.
 - 1. University’s action will be taken with reasonable promptness, while allowing sufficient time in University’s professional judgement to permit adequate review.
 - 2. University shall be entitled to rely upon adequacy, accuracy, and completeness of data, and certifications prepared by Contractor.
 - 3. If necessary, University will request additional information or documentation for evaluation after initial review

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

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PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

1.2 CHANGE ORDER PROPOSAL REQUESTS

- A. University-Initiated Proposals: The University will issue a detailed description of proposed changes in the Work that require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal requests issued by the University are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - 2. Within a mutually agreed upon time period, submit an estimate of cost necessary to execute the change to the University for review.
 - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities. Include required labor or unit costs, with totals for each labor category. Include all credits for deleted work.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts for new work.
 - c. Provide credit for deleted work including applicable taxes, delivery charges, and equipment rental.
 - d. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the University.

1. Outline the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. List quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities. Include required labor or unit costs, with totals for each labor category. Include all credits for deleted work.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts, for new work.
4. Provide credit for deleted work including applicable taxes, delivery charges, and equipment rental.
5. Submit Substitution Request if the proposed change requires substitution of one product or system for a specified product or system.

✎ Proposal Request Procedure: Submit request as directed by the University using the PMIS.

1.3 UNIT PRICES **<DELETE IF PROJECT DOES NOT INCLUDE UNIT PRICES>**

- A. Take measurements and compute quantities. Contractor will verify measurements and quantities.
- B. Unit Quantities: Actual quantities supplied or placed in the Work determine payment.
- C. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by University multiplied by unit sum/price.
- D. Measurement of Quantities:
 1. Weigh Scales: Inspected, tested and certified by applicable Weights and Measures department within past year.
 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
 3. Metering Devices: Inspected, tested and certified by applicable State department.
 4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
 5. Measurement by Volume: Measured by cubic dimension using mean length, width
and height or thickness.
 6. Measurement by Area: Measured by square dimension using mean length and width or radius.

8. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.

1.4 CHANGE ORDER APPROVAL

- A. The University will issue a contract amendment after review and approval of a change request.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 012900 – PAYMENT PROCEDURES

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PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of Schedule of Values with preparation of the Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values (SOV) with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of allowances.
 - e. Contractor Contingency
 - f. Schedule of alternates.
 - g. List of products.
 - h. List of principal suppliers and fabricators.
 - i. Schedule of submittals.
 - 2. Submit the Schedule of Values to the University at the earliest possible date but no later than 10 business days before the date scheduled for submittal of the initial Applications for Payment.
 - 3. Subschedules: Where Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Organize the Schedule of Values using the standard Project Manual specification list. Provide at least one line item for each Specification Section. If no values are associated with a specifications section, note N/A or similar.
 - 1. Identification: Include the following Project identification on the Schedule of Values:

- a. University Project number and Project name
 - b. Location.
 - c. Contractor's name and address.
 - d. Date of submission.
2. Provide a breakdown of the Contract sum in sufficient detail to allow evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items as reviewed and approved by the University.
3. Include as a minimum:
 - a. Material
 - b. Labor
 - c. Closeout
 - d. Punchlist
 - e. Environmental Remediation

<Edit for GC projects without a Construction Manager>

4. Construction Management contracts shall carry separate detail lines for at least the following lines:
 - a. Preconstruction Services
 - b. Staff General conditions
 - c. Non-staff general conditions
 - d. Bonds and Insurance.
 - 1) Note that subcontractor bonds are not required to be separately listed.
 - e. Fee
 - f. Closeout
5. Round amounts to nearest whole dollar; confirm that the total equals the Contract sum.
6. Provide a separate line item in the Schedule of Values for stored materials or equipment, purchased or fabricated, but not yet installed.
 - a. Differentiate between items stored onsite and items stored offsite. Include requirements for insurance and bonded warehousing, if offsite.
7. All contracts shall assign a minimum of 1% of the contract value for final completion and project closeout. This item must be identified as a separate line item labeled Closeout on the SOV.
8. Environmental Remediation: Due to changes to Generally Accepted Accounting Practices, environmental remediation must be separately reported in the University's financial statements. Accordingly, all contracts shall carry remediation costs in separate lines clearly marked remediation. These titles should not be used in other line descriptions.
9. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

<DELETE IF NOT APPLICABLE FOR PARTICULAR PROJECT>

10. Unit Cost Allowances-Cost Allowances: Show the line-item value of unit cost allowances, as a product of the unit cost, multiplied by the measured or estimated

quantity if amount cannot be measured. Estimate quantities from the best indication in the Contract Documents.

11. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment.
 - a. Each item in the Schedule of Values and Applications for Payment shall be complete.
 - b. Include the total cost and proportionate share of general overhead and profit margin for each item.
Temporary facilities and other major cost items that are not direct cost of actual work in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

1.3 APPLICATIONS FOR PAYMENT

- A. Refer to the University of Maryland Baltimore Standard General Condition of Construction for requirements and procedures governing applications for payment.
- B. Each Application for Payment shall be consistent with previous applications and payment as paid for by the University.
 1. Additional requirements apply to the initial Application for Payment, Application for Payment at Substantial Completion and Final Application for Payment.
- C. Substantial Completion Application for Payment: Following issuance of the Certificate of Substantial Completion, submit this Application for Payment.
 1. This application shall reflect any Certificates of Partial Substantial Completion issued previously for University occupancy of designated portions of the Work.
 2. Submittals and Administrative actions that should be submitted before or at the same time as this application include: All Substantial Completion Requirements from 017700 - CLOSEOUT PROCEDURES
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test and balance reports.
 - d. Operation and Maintenance Manuals.
 - e. Startup Reports.
 - f. Commissioning and Functional Testing Reports.
 - g. Verification of Final cleaning.
 - h. Application for reduction of retainage and consent of surety.
 - i. Certificate of Insurance
 - j. Substantial Completion Outstanding Work List
- D. Final Payment Application:

1. Submittals and Administrative actions that should be submitted before or at the same time as this application include: Completion of Project closeout requirements.
 - b. Waivers and releases.
 - c. Updated final statement, accounting for final changes to the Contract Sum.
 - d. Certification of completion of Substantial Completion Outstanding Work List
 - e. Resolve all previously unsettled claims.
 - f. Transmittal of required Project construction records to the University.
 - g. Proof that taxes, fees, and similar obligations were paid.
 - h. Final MBE reconciliation, including a list of all MBE commitments by MBE entity, amount actually paid to entity, and if the entity was not a tier subcontractor to the prime, the tier 1 subcontractor they were paid through.
 - i. Sworn statement of payments to all subcontractors.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Web-based Project management software package.
 - 6. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. This Section includes administrative and procedural requirements for coordination of construction activities, preparation of coordination drawings, and administration of project meetings, including preconstruction conferences, progress meetings, and coordination meetings.

1.2 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms approved for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: At the Post-Bid Scope Review, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list contact information including emergency backup.

1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

C. Coordination Drawings

1. Coordination drawings combine work of multiple trades and disciplines into a single integrated layout. The coordination drawings identify a final construction plan where all 3-D space conflicts have been resolved.
2. Contractor is responsible for determining what method to use to generate coordination drawings using traditional CAD comparison, BIM modeling, or other methods as approved by the University.

<Include next sentence if project requires BIM meetings>

3. BIM meetings to resolve clash issues may include participation by the contractor teams, design team, owner and any designated representatives.
4. By submission of final Coordination Drawings, the contractor certifies that the drawings reflect a construction plan that meets the requirements of the original project design and that all conflicts have been resolved.

1.3 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Coordinate, communicate, and schedule work with any outside entities that impact the project or that may be impacted by project work.
 - a. Entities may include people such as clients, occupants, owner hired contractors, and contractors on adjacent project sites

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for University and separate contractors if coordination of their Work is required.

C. Written Coordination Directives:

When special coordination procedures are required, prepare and distribute written

coordination instructions or memoranda to affected parties, including required notices, reports, and identification of attendees at coordination meetings.

- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.4 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity. At a minimum, prepare coordination drawings for mechanical rooms, electrical rooms, substation rooms, and other areas of congested construction requiring multi-trade coordination.

<Include specific requirements if needed for project. Remove for small projects>

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use project Drawings as the starting point for coordination drawings. Prepare sections, elevations, and details as needed to show 3D space requirements without conflicts.
 - b. Include trade-specific information to coordination as needed to resolve conflicts between installed components.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Show clearances for routine maintenance and replacement of components.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences for constructability.
 - g. Show dimensions on Drawings. Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements.

Provide alternative layouts to Architect and University for proposed resolution of such conflicts. Minor dimension changes and difficult installations are not considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

<Edit for project. Small projects may only require Coordination Drawings for Mechanical Rooms or specific locations.>

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling, raised access floor, and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

<Typically only required for New Construction or Major Renovation>

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor-control center locations.

- d. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 9. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will inform the Contractor, who shall make suitable modifications and resubmit.

<Include if project includes BIM meetings>

- a. Architect may review and confirm coordination as part of participation in BIM meetings in lieu of formal review of final coordination drawings.

<Edit for specific project. Small projects will not typically require digital coordination data files and paragraph can be deleted.>

- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 - 1. File Preparation Format:
 - a. <Edit for project. Identify software or data type.> Same digital data software program, version, and operating system as original Drawings.
 - 2. File Submittal Format: Submit or post coordination drawing files using PDF format.
 - 3. BIM Files: Construction Manager will incorporate all trade input in final BIM established for Project.
 - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts. Indicate where conflict resolution requires modification of design requirements by Architect.

<Edit for project if Architect will provide BIM files to the Contractor>

- 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Contractor and Architect will coordinate and come to agreement on any permissions or requirements for use of the files for this purpose.

1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return without response those RFIs submitted to Architect anyone other than the Contractor.
 - 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following as specified by the University PMIS requirements:
 - 1. University's Project number and name
 - 2. University name.
 - 3. Name of Architect and GC/CM.
 - 4. Date.
 - 5. Name of Contractor.
 - 6. RFI number, numbered sequentially.
 - 7. RFI subject.
 - 8. Specification Section number and title and related paragraphs, as appropriate.
 - 9. Drawing number and detail references, as appropriate.
 - 10. Field dimensions and conditions, as appropriate.
 - 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 12. Contractor's signature.
 - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: Use form included in the University PMIS process.
- D. Architect's, University's and Construction Manager's Action:
 - 1. Architect and Construction Manager will review each RFI, determine action required, and respond. Allow five (5) days for Architect's response for each RFI.
 - 2. The following items are not considered RFIs and will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - 3. Incomplete RFIs or inaccurately prepared RFIs will be returned without action.

4. Architect's action may include a request for additional information. Architect's time for response will reset from date additional information receipt by Architect.
 5. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and University in writing within five days of receipt of the RFI response.
- E. RFI Log: RFI Log is available in the University PMIS.
- F. On receipt of Architect's and Construction Manager's action, review response and notify Architect and Construction Manager within two days if Contractor disagrees with response.

1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

Select either A or B below.

- A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model/CAD drawing digital data files for Contractor's use during construction.
- B. Use of Architect's Digital Data Files: Digital data files of Architect's **BIM model/CAD drawings** will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.

Architect to edit section with firm requirements

3. Digital Drawing Software Program: Contract Drawings are available in **<Insert name and version of digital drawing software program and operating system>**.
4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to University and Architect.
 - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of **[AIA Document C106] [Agreement included in this Project Manual] [Agreement acceptable to University and Architect]**.
5. **<Insert additional conditions on which digital data drawing files will made available>**.
6. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
 - c. **<Insert name of digital data file>**.

- C. University PMIS: Use University's web-based Project management software package to manage Project communication and documentation through Final Completion.
- D. PDF Document Preparation:
 - 1. Assemble information into a single file with appropriate bookmarks.
 - 2. File names must include project number and meet university file naming conventions.
 - 3. Certifications: When required, digitally submitted certificates and certifications must include a digital signature.

1.7 PROJECT MEETINGS **<Edit for project specific requirements>**

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Determine necessary attendees based on meeting type. Coordinate with University Project manager.
 - 2. Scheduling: Inform invitees of date and time of each meeting. Notify University and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
 - 3. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 4. Minutes: Entity responsible for conducting meeting will record significant discussions, decisions, and action items, and shall distribute the meeting minutes to everyone concerned, including University and Architect, within three days of the meeting.
- B. Preconstruction Conference:
 - 1. Schedule and conduct a preconstruction conference before starting construction, at a time convenient to University and Architect, but no later than x number of days prior to mobilization. ~~15 days after execution of the Agreement.~~
 - 2. Attendees:
 - a. Authorized representatives of University,
 - b. University's Commissioning Authority,
 - c. Architect, and their consultants;
 - d. Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties
 - 3. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 4. Agenda: Discuss items of significance that could affect progress, including the following:

-
- a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for processing University's Supplemental Instructions and Contract Clarification.
 - j. Procedures for RFIs.
 - k. Procedures for testing and inspecting.
 - l. Procedures for processing Applications for Payment.
 - m. Outage Procedures
 - n. Distribution of the Contract Documents.
 - o. Submittal procedures.
 - p. Sustainable design requirements.
 - q. Preparation of Record Documents.
 - r. Use of the premises
 - s. Work restrictions.
 - t. Working hours.
 - u. University's occupancy requirements.
 - v. Responsibility for temporary facilities and controls.
 - w. Procedures for moisture and mold control.
 - x. Procedures for disruptions and shutdowns.
 - y. Construction waste management and recycling.
 - z. Parking availability.
 - aa. Office, work, and storage areas.
 - bb. Equipment deliveries and priorities.
 - cc. First aid.
 - dd. Security.
 - ee. Progress cleaning.
5. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
- 1. Attendees:
 - a. Installer
 - b. Manufacturer representatives
 - c. Fabricators
 - d. Subcontractors involved in or affected by the installation and its coordination

-
2. Advise Architect, Construction Manager, and University's Commissioning Authority of scheduled meeting dates.
 3. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 4. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions in the meeting minutes.
 5. Reporting: Distribute minutes of the meeting to each party present, other parties requiring information, and upload to the University PMIS.
 6. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to University and Architect, but no later than when the project is 75 percent complete.
1. Review requirements and responsibilities related to Project closeout.
 2. Attendees:

-
- a. Authorized representatives of University,
 - b. **University's Commissioning Authority,**
 - c. **Construction Manager,**
 - d. Architect, and their consultants;
 - e. Contractor and its superintendent;
 - f. Major subcontractors; suppliers; and other concerned parties
 3. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 4. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for completing sustainable design documentation.
 - f. Requirements for preparing operations and maintenance data.
 - g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - k. Coordination of separate contracts.
 - l. University's partial occupancy requirements.
 - m. Installation of University's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
 5. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct will conduct progress meetings at **<Insert appropriate interval>** intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees:
 - a. Authorized representatives of University,
 - b. University's Commissioning Authority,
 - c. Construction Manager, and
 - d. Architect,
 - e. Based on current progress, planning, coordination, and performance of future activities include the following:
 - 1) subcontractors
 - 2) suppliers
 - 3) other related entities

-
3. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 4. Agenda:
 - a. Review and correct or approve minutes of previous progress meeting.
 - b. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - c. Contractor's Construction Schedule:
 - 1) Review progress since the last meeting.
 - 2) Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.
 - 3) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
 - 4) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 5) Review schedule for next period.
 - d. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Submittal status.
 - 5) Sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) RFI status
 - 16) Proposal Requests
 - 17) Pending changes.
 - 18) Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
 5. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updates: Revise Contractor's construction schedule after each progress meeting. Issue revised schedule concurrently with the report of each meeting.

-
- F. Coordination Meetings: Conduct Project coordination meetings at **<Insert appropriate interval>** intervals. Project coordination meetings are in addition to specific meetings held for other purposes, to address specific issues requiring coordination between multiple disciplines.
1. Attendees:
 - a. Authorized representatives of University,
 - b. University's Commissioning Authority,
 - c. Construction Manager, and
 - d. Architect,
 - e. Based on current progress, planning, coordination, and performance of future activities include the following:
 - 1) subcontractors
 - 2) suppliers
 - 3) other related entities
 2. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda:
 - a. Review and correct or approve minutes of the previous coordination meeting.
 - b. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - c. Combined Contractor's Construction Schedule:
 - 1) Review progress since the last coordination meeting.
 - 2) Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule.
 - 3) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
 - 4) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - d. Schedule Updates: Revise combined Contractor's construction schedule after each coordination meeting. Issue revised schedule concurrently with report of each meeting.
 - e. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Submittal status.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.

- 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) RFIs
 - 15) Proposal Requests.
 - 16) Change Orders.
 - 17) Pending changes.
4. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

<Edit GANTT-CHART and CPM SCHEDULE REQUIREMENTS to include when Initial Schedule is due.>

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Construction schedule update reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Unusual event reports.

1.2 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following file format:
 - 1. Working copy of schedule file in original software format.
 - 2. PDF file.
- B. Contractor's Construction Schedule: Initial schedule file showing entire construction period.
 - 1. Submit a working copy of schedule file in original software format. Comply with university file naming conventions.
- C. CPM Reports:
- D. Construction Schedule Update: Submit with Applications for Payment.

- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at weekly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.
- I. Qualification Data: For scheduling consultant.

1.3 QUALITY ASSURANCE

A. Prescheduling Conference:

1. Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule.
2. Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."
3. Agenda: **<Include as applicable>**
 - a. Review software limitations and content and format for reports.
 - b. Verify availability of qualified personnel needed to develop and update schedule.
 - c. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial University occupancy.
 - d. Review delivery dates for University-furnished products.
 - e. Review schedule for work of University's separate contracts.
 - f. Review submittal requirements and procedures.
 - g. Review time required for review of submittals and resubmittals.
 - h. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - i. Review time required for Project closeout and University startup procedures, including commissioning activities.
 - j. Review and finalize list of construction activities to be included in schedule.
 - k. Review procedures for updating schedule.

1.4 SCHEDULE COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.
3. Include time for all testing and inspections identified as required for project.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within <x> 30 days of date established for the Notice to Proceed.
 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 1. Primavera P6 for current Windows operating system.
 2. Microsoft Project is acceptable for smaller projects.
- C. Scheduling Coordinator: Identify Scheduling Coordinator to provide planning, evaluation, and reporting, using CPM scheduling.

[Edit for project if scheduling coordinator option is known.](#)

1. In-House Option: If Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques, submit qualifications for University review.
 2. Consultant Option: Engage a qualified Scheduling Consultant. Submit qualifications for university review.
 3. Scheduling consultant to attend all meetings related to Project progress, alleged delays, and time impact.
- D. Time Frame: Set schedule from date established for the Notice to Proceed to date of Final Completion.
 1. Contract completion date may not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- E. Float Usage: Float reflected in the Contractor's Construction Schedule shall be managed in accordance with the General Conditions. Float shall not be scheduled, allocated, or

used by the Contractor as a basis for entitlement to additional Contract Time. The University reserves the right to direct the use of available float as necessary to manage, sequence, or coordinate the Work.

- F. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by University and Architect.
 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.
 - b. Temporary facilities.
 - c. Construction of mock-ups, prototypes and samples.
 - d. University interfaces and furnishing of items.
 - e. Interfaces with Separate Contracts.
 - f. Regulatory agency approvals.
 - g. Punch list.
 3. Procurement Activities: Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Include procurement process activities as separate activities in schedule for the following:
 - 1) Long lead-time items and major items,
 - 2) Items requiring a cycle of more than 60 days,
 4. Submittal Review: Include review and resubmittal times indicated in Section 013300 Submittal Procedures in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 5. Startup and Testing: Include no fewer than 15 days for startup and testing.
 6. Commissioning and Functional Testing: Allow sufficient time in schedule to include all commissioning activities including scheduling tests and observations. [Include no fewer than 15 days for commissioning Functional Performance Testing.]
 7. Substantial Completion: Allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion. Schedule construction completion prior to date established for Substantial Completion.
 8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items prior to Final Completion.
- G. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

-
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by University: Include a separate activity for each portion of the Work performed by University.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 Summary. Delivery dates indicated stipulate the earliest possible delivery date.
 5. University-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Base delivery dates on the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction
 - b. Limitations of continued occupancies
 - c. Uninterruptible services
 - d. Partial occupancy before Substantial Completion
 - e. Use-of-premises restrictions
 - f. Provisions for future construction
 - g. Seasonal variations
 - h. Environmental control
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards
 - b. Submittals
 - c. Purchases
 - d. Mockups
 - e. Fabrication
 - f. Sample testing
 - g. Deliveries
 - h. Installation
 - i. Tests and inspections
 - j. Adjusting
 - k. Curing
 - l. Building flush-out
 - m. Startup and placement into final use and operation
 - n. Commissioning
 - o. Functional Testing
 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

-
- a. Structural completion
 - b. Temporary enclosure and space conditioning
 - c. Permanent space enclosure
 - d. Completion of mechanical installation
 - e. Completion of electrical installation
 - f. Substantial Completion
 9. Other Constraints: **<Insert constraints not indicated elsewhere>**.
 - H. Milestones: Include milestones identified in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion, and the following interim milestones:
 1. Temporary enclosure and space conditioning.
 2. **<Insert milestones not indicated elsewhere>**.
 - I. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 1. Unresolved issues
 2. Requests for Information
 3. Submittals
 - a. Rejected or unreturned submittals
 - b. Notations on returned submittals
 4. Pending modifications affecting the Work and the Contract Time.
 - J. Contractor's Construction Schedule Update: Update schedule monthly to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule with the associated meeting report.
 2. Write a report that identifies the reason for each change to the updated schedule, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. Update Final Completion percentage for each activity on each schedule.
 - K. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
 1. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
-

2. Identify causes for delay.

- L. Distribution: Distribute schedules and schedule updates electronically to the Architect, University, and other parties with a need-to-know responsibility. Electronic distribution through the Project Management Information System (PMIS) shall constitute official distribution.

1.6 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, preliminary Gantt-chart-type construction schedule at Scope Review.
1. If schedule was submitted during bid phase, update schedule based on current conditions.
- B. Preparation: Indicate each significant construction activity separately. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work.

1.7 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Preparation:
1. Indicate each significant construction activity separately.
2. Identify first workday of each week with a continuous vertical line.
3. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

Edit if CPM schedule is required.

1.8 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram:
1. Submit diagram within 14 days of date established for the Notice to Proceed.
2. Outline significant construction activities for the first 90 days of construction.
3. Include skeleton diagram for the remainder of the Work
4. Include cash requirement prediction based on indicated activities.

-
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract does not excuse Contractor from completing all work within applicable completion dates.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 3. Measure individual activities in workdays. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals
 - b. Mobilization and demobilization
 - c. Purchase of materials
 - d. Delivery
 - e. Fabrication
 - f. Utility interruptions
 - g. Installation
 - h. Work by University that may affect or be affected by Contractor's activities
 - i. Testing and inspection
 - j. Commissioning
 - k. Punch list and Final Completion
 - l. Activities following Final Completion
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates to be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data and reorganize activity sequences as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

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4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks as separate electronic views are permissible for activities clearly off the critical path.
 5. Concurrent with CPM schedule, submit each of the following reports.
 - a. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
 - b. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
 - c. Total Float Report: List of activities sorted in ascending order of total float.
 - d. Format for each activity in reports to contain, in calendar days:
 - 1) activity number,
 - 2) activity description,
 - 3) cost and resource loading,
 - 4) original duration,
 - 5) remaining duration,
 - 6) early start date,
 - 7) early finish date,
 - 8) late start date,
 - 9) late finish date, and
 - 10) total float
- E. Contract Modifications: When submitting a contract modification request, if the proposed contract modification includes a time adjustment, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity
 2. Description of activity
 3. Main events of activity
 4. Immediate preceding and succeeding activities
 5. Early and late start dates
 6. Early and late finish dates
 7. Activity duration in workdays
 8. Total float or slack time
 9. Average size of workforce
 10. Dollar value of activity (coordinated with the schedule of values)

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- G. Schedule Updates: With each schedule update, provide tabulated report of any changes to the following:
1. Activities
 2. Early and late start dates
 3. Early and late finish dates
 4. Activity durations in workdays
 5. Critical path
 6. Total float or slack time
 7. Contract Time

1.9 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site. Submit the report using the University PMIS:
1. List of subcontractors at Project site
 2. List of separate contractors at Project site
 3. Approximate count of personnel at Project site
 4. Equipment at Project site
 5. Material deliveries
 6. High and low temperatures and general weather conditions, including presence of rain or snow
 7. Testing and inspection
 8. Accidents
 9. Meetings and significant decisions
 10. Unusual events
 11. Stoppages, delays, shortages, and losses
 12. Meter readings and similar recordings
 13. Emergency procedures
 14. Orders and requests of authorities having jurisdiction
 15. Change Orders received and implemented
 16. Change Directives received and implemented
 17. Services connected and disconnected
 18. Equipment or system tests and startups
 19. Partial completions and occupancies
 20. Substantial Completions authorized
- B. Material Location Reports: Weekly, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing both materials previously reported and recently delivered items. Include a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, submit a Request for Information with a detailed report.. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise University in advance when these events are known or predictable.
1. Submit unusual event reports directly to University within one day of an occurrence. Distribute to parties affected by the occurrence, including the Architect and University.
- E. Submit all reports required by this Section through the University's PMIS unless otherwise directed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

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.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for construction photographs for the following types of projects:
 - 1. New construction projects.
 - 2. Campus renovation projects.

1.3 CONTRACTOR REQUIREMENTS

- A. The Contractor shall make arrangements to have a series of construction photographs taken of the construction site utilizing their personnel with a digital camera.
- B. The Contractor shall maintain an up-to-date electronic file of the photographs in numerical order per month in an XL spread sheet format as follows:
 - 1. The XL spread sheet shall include a header with the UM Project Name and Project Number. Under the header include columns for “Photo #”, “Date” “Location on Project Site”, “View of the Photo” “Description” and “Photograph”. For Example:
 - a. Photo #1
 - b. 6-5-12
 - c. Roof Level
 - d. Looking East
 - e. Roof Flashing at Stair Tower
 - f. Photograph

1.4 SUBMITTALS

- A. Monthly: Submit construction photographs, electronically, in “pdf” file format to the University Project Manager (PM) monthly with the application for payment.
 - 1. Organize the electronic “pdf” files as indicated in paragraph 1.3 above.
 - 2. Pre-construction photographs shall be submitted with the first application for payment.

1.5 PHOTOGRAPHIC REQUIREMENTS

- A. The Contractor shall take a series of construction photographs to document conditions at the project site and during various stages of construction as follows:
 - 1. Pre-Construction Photographs: Prior to the start of construction take photographs of the project site and adjacent areas as follows:
 - a. New Projects: Take photographs in sufficient number to show existing conditions adjacent to the work areas before starting work. Where applicable, take photographs of existing buildings either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction.
 - b. Campus Renovation Projects: Take photographs in sufficient number to show existing conditions adjacent to the work areas, to indicate pre construction damage to existing walls, partitions, insulation, previous work that was not completed, and/or missing materials before starting work.
 - 2. Construction Progress Photographs:
 - a. Take project photographs, in accordance with requirements indicated, to best show the status of construction and progress since taking previous photographs.

<Edit frequency based on project duration.>

- b. Frequency: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.
 - c. Vantage Points: Comply with the University's directions concerning desired vantage points for shots.
 - 3. Time – Lapse Video: Submit time-lapse sequence video recordings at project completion, or when agreed for new building construction. <Remove for small projects>
 - a. Submit time-lapse sequence video recordings by uploading to University PMIS.
 - b. Identification: For each recording, provide the following information:
 - 1) Name of Project.
 - 2) Name and contact information for photographer.
 - 3) Name of University, Architect, and Construction Manager.

- 4) Name of Contractor.
 - 5) Date(s) and time(s) video recording was recorded.
 - 6) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
4. Record Photograph Files:
 - a. At the end of the project submit a complete set of record photographs through University PMIS.
5. Post Construction Photographs:
 - a. After the project has completed if the A/E, the Contractor, and/or other contractors would like to have a series of post construction photographs taken of the project site they must submit a written request to the University PM. The PM will contact the contact the appropriate University representatives to gain approval and set up a time for the photographs to be taken. Post construction photographs will not be allowed without the approval of the end user or their representative.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 013300 – SUBMITTAL PROCEDURES

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals by the Contractor as required by the contract documents.

1.2 SUBMITTAL REGISTER

- A. Prepare a Submittal Register in spreadsheet format for use in the PMIS. Register will include the following for each anticipated submittal:
 - 1. Specification Title
 - 2. Category
 - 3. Specification Section
- B. Submit Register for review prior to first application for payment.

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Contractor shall prepare and submit a Submittal Schedule which lists submittal items per the product specifications for review and approval by the Architect. Contractor shall allow fifteen (15) days for Architect and University review. The Submittal Schedule shall identify all specified submittals to be made and shall serve as a checklist for submittals. Arrange the submittals in numerical order by specification section. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Use the Preliminary Project Submittal Register as a basis for identifying required submittals, including requirements for concurrent submittals, and complex submittals which may require additional review time by the Architect at Initial Review.

2. Coordinate Submittal Schedule with list of subcontracts, the Schedule of Values, and Contractor's construction schedule.
3. Format: Submit the Submittal Schedule as a Microsoft Excel file or as designated by the UMB PM. Use the University-provided excel template which can be found in the University PMIS submittal folder.
4. Review of any submittal without submission and approval of submittal schedule does not relieve Contractor of responsibility to provide Submittal Schedule for approval.
5. Contractor shall revise Submittal Schedule as required to include addition or deletion of submittals during project duration.

1.2 SUBMITTAL FORMATS

A. Action Submittals:

1. Only include information from a single specification section. Submittals may not bundle products or equipment from multiple spec sections. Contractor may use their own discretion on how information is divided and number of submittals provided under each specification section.
2. Product Data can be submitted before or concurrent with Shop Drawings and with Samples unless otherwise noted in individual specification sections. Product data, shop drawings, color charts and/or samples can be submitted as a single submittal where appropriate.
3. Each Action Submittal shall clearly indicate the products that will be provided by the contractor, including indicating selected options. Where published data sheets are provided which indicate the availability of multiple products or multiple options/selections for products, clearly mark the submittal using arrows, clouds, boxes, or highlighting to indicate intended options and selections for each product.
4. Do not include manufacturer's warranty and/or operation and maintenance instructions in Action Submittals. Include this information in the project operation and maintenance manual submittal.
5. Only include information related to the specific materials used on the project. Do not submit complete product catalogs. Submittals with excess unrelated content will be returned without review.

B. Informational and Closeout Submittals:

1. Submit Informational and Closeout submittals separately from Action Submittals.

C. Processing Submittals:

1. Submittals are processed electronically using University PMIS. Transmit all submittals from Contractor to Architect via University PMIS unless otherwise directed. Submittals received from sources other than the Contractor will be

returned without action. Include all submittal identification information specified below.

1.3 SUBMITTAL IDENTIFICATION FORM

- D. Use the standard UMB Submittal Identification Form, as the first page of the submittal file. Fill out the following information for each submittal at a minimum:
1. Project name and University project number.
 2. Submittal Title and Revision
 - a. Submittal name shall match University PMIS Submittal Register.
 3. Specification Section
 - a. Include subsection if project uses condensed specifications.
 4. Submission date.
 5. Name of Architect or Primary Consultant.
 6. Name of Contractor.
 7. Names of subcontractor or firm that prepared the submittal as applicable.
 8. Identification of the Contract Document issue date and revision upon which the submittal is based.
- E. Submittals not including a Submittal Identification Form will be returned as “Not Reviewed”.
- F. The Submittal Identification Form shall be updated by each reviewer to show review action, notes, signature, and date. Architect or Prime Designer will note final review action before returning to the contractor.
- G. The Submittal Identification form shall remain the first page of the submittal throughout the review process.

1.4 CONTRACTOR SUBMITTAL COVER SHEET

- A. Use the Contractor, subcontractor or vendor cover, as the second page of the submittal file. Contractor should use their standard cover sheet for this page which shall include the following information for each submittal at a minimum:
1. Project name and University project number.
 2. Submission date.
 3. Name and address of Contractor.
 4. Name of firm or entity that prepared submittal.
 5. Names of subcontractor, manufacturer, and supplier as applicable.
 6. Category: Action or Informational.

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7. Specification section.
 8. Identification of the Contract Document issue date and revision upon which the submittal is based (including addenda, early release packages, or phased design submissions, if applicable).
 9. Unique submittal title, including revision identifier.
 10. Type of submittal (product data, test report, etc.).
 - a. When a submittal item includes multiple types of submittals (Product Data, Shop Drawings, Qualifications, etc) note all that apply.
 - b. University PMIS only allows selection of one type of submittal. When multiple submittal types are submitted together, choose the category that is the most explanatory.
 11. All listed information shall be identical to that listed in the approved University PMIS Submittal Register.
 12. Other necessary identification.
 13. Contractor's certification that information submitted complies with requirements of the Contract Documents, to include, but not be limited to, quantities, dimensions, and coordination with other work.
- B. Identify each element in a Submittal Item by a unique identifier that can be used to clearly correlate the submittal with Contract Drawings such as:
1. Specifications article and paragraph ,
 2. Drawing number.
 3. ID number in drawing schedule,
 4. Assembly or Equipment number,
 5. Other pertinent identifying information
- C. Clearly and explicitly identify all deviations from the Contract Documents, including minor variations and limitations. If Contractor fails to identify deviations they certify that the submittal fully complies with the Contract Documents.
- D. Input each Submittal Item using the University PMIS Submittal Module using identical information from the approved Submittal Schedule.
- E. Options: When a specific feature such as color has been selected as part of the design, mark the selection on the submittal. If the selection is not in the project design, provide options available for selection by the Architect.

1.5 SUBMITTAL PDF FILE REQUIREMENTS

- A. PDF Submittals: Prepare submittals as a single PDF. Incorporate complete information into the PDF file.

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1. Remove all extraneous material such as installation instructions, operations and maintenance manuals, and product catalogs.
 - B. Submitted PDF shall have searchable text throughout. Optical Character Recognition (OCR) is not acceptable.
 - C. Bookmarks: Include bookmarks for files larger than 15 pages. Set bookmarks for each product in the submittal file. Label each product bookmark with the Title, Specification Article Number, or Equipment Designation if applicable. See examples below and sample bookmarks in Part 3:
 - D. Example:
 1. 2.2 Shut Off Valves
 2. 2.4 Check Valves
 3. 2.5 Special Valves
 4. AHU-1
 - E. Clearly identify submitted products and any selected options and selections for each product when multiple options are shown in submitted product data. Mark the selections in the pdf using arrows, clouds, boxes or highlighting.
 - F. University Selected Options: When the specification does not identify a manufacturer's specific feature, such as color, provide options available for selection by the Architect and University.
 - G. A submittal must be complete without any external links. Hyperlinks to documents on the web are not allowed and are not acceptable as a substitution for product data.
 - H. Submittal File Names
 1. Submittal file names shall follow the convention:
 - a. [UMB Project Number][UMB specification section number][submittal title].pdf.
 2. For projects using condensed specifications:
 - a. [UMB Project Number][UMB division number, article number][submittal title].pdf.
 3. Avoid long file names. Use names which are identifiable when compared to the University PMIS Submittal Register. Provide revision number where applicable.
 4. See examples below:
 - a. Full Version Specification:
 - 1) 19-357 087100 Door Hardware.pdf

- 2) 19-357 230523 Valves for HVAC Piping Systems.pdf
- b. Condensed Specification:
 - 1) 19-357 22 - 2.6 Plumbing Valves.pdf
 - 2) 19-357 23 - 2.2 HVAC Valves R1.pdf
- 5. Contractor's file names shall not be altered by the A/E and UMB except adding the A/E and UMB Initials (XXX) at each review step. See examples below:
 - a. Full Version Specification:
 - 1) 19-357 087100 Door Hardware AE.pdf
 - 2) 19-357 230523 Valves for HVAC Piping Systems AE UMB.pdf
 - b. Condensed Specification:
 - 1) 19-357 22 - 2.6 Plumbing Valves AE.pdf
 - 2) 19-357 23 - 2.2 HVAC Valves R1 AE UMB.pdf

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit types of submittals with submittal items as required by individual Specification Sections. Examples of types of submittals include product data, shop drawings, color charts and/or samples. Each submittal shall be one University PMIS item.
- B. Use the University PMIS Submittal Module to create each Submittal Item. Persons entering submittals shall be trained by UMB on the University PMIS Submittal Module prior to entering the Submittal Schedule and any other submittals. Upload the pdf of the submittal directly to the University PMIS Submittal Module.

1.7 Coordination:

- A. Coordinate schedule for preparation and processing of submittals with performance of construction activities such as fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
- B. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are approved by the UMB PM.

Where a work process includes requirements under separate specification sections, submit these submittals at the same time to avoid delays in processing due to requirement for concurrent review. **EDIT FOR PROJECT AND CLEARLY PROVIDE INSTRUCTIONS TO CONTRACTOR IN PRELIMINARY SUBMITTAL REGISTER**

- 1. Specific submittals need to be reviewed concurrently, including but not limited to, the following:
 - a. 087100 Door Hardware with 281300 Access Control System
 - b. 042100 Brick and Mortar.

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- c. 090000 Wall and floor finishes for coordination of colors.
2. Submittals that require selection of colors will be reviewed. Color selection may not be provided until all submittals requiring color selection have been received and reviewed, and color selections have been approved by the Architect.
 3. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittal Comments: Submittal comment markups entered on the submittal by the Supplier, CM / Contractor, Consultant (A/E), and UMB Personnel shall use the following colors.
1. Supplier, CM / Contractor: Dark Green
 2. Consultant (A/E): Red
 3. UMB: Blue
- D. Processing Time:
1. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the work to permit processing, including resubmittals.
 2. Submittal review, including time for resubmittals is assigned as follows:
 - a. Initial Review: Allow 15 working days for initial review of each submittal (which includes University's review)
 - 1) 10 business days for AE review
 - 2) 5 business days for University Review
 3. Complicated submittals may be allocated additional time as noted on the approved Submittal Schedule. Allow additional time if coordination with concurrent submittals is required. The Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - a. Initial Review of Concurrent Submittals: Allow additional time if coordination with concurrent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - b. Initial Review of Complex Submittals: At the time of review and approval of the Submittal Schedule, the Architect will advise Contractor of certain submittals that are substantially complicated or require multiple reviewers and need an extended initial review time, including but not limited to, the following:

EDIT FOR PROJECT AND PROVIDE INSTRUCTIONS TO CONTRACTOR IN PRELIMINARY SUBMITTAL REGISTER

- 1) 081113 Hollow Metal Doors and Frames (21 days)
- 2) 084413 Glazed Aluminum Curtainwall (30 days).
- 3) 087100 Door Hardware (21 days).
- 4) 123600 Wood Laboratory Furniture (21 days)

- 5) 142100 Elevators (45 days) includes Elevator Inspector review.
- 6) 210000 Fire Protection Submittal (45 days) includes Fire Marshal review.
- 7) 230923 Control Sequences (21 days)
- 8) 281300 Access Control System (21 days)
- 9) 282300 Video Surveillance (21 days)
- 10) 283111 Digital Addressable Fire-Alarm System (45 days) includes Fire Marshal review.

4. Resubmittals: Allow 15 days for review of each resubmittal.

E. Resubmittals: Make resubmittals in same form as initial submittal.

- 1. Note date and content of previous submittal only (do not include entire rejected submittal).
- 2. Note date and content of revision in Submittal Identification Form.
- 3. Clearly indicate extent of revision on Contractor's Cover Sheet.
- 4. Provide responses to Architect's review comments as appropriate to address concerns raised.
- 5. Annotate the product data sheets, shop drawings, calculations, etc. to clearly indicate compliance with the original specification requirements and to demonstrate compliance with review comments.
- 6. Do not resubmit partial submittals. Resubmittal must be complete.
- 7. Submittals shall be resubmittal until they are marked as Approved by the Architect.

F. Delegated Design Services Certification: In addition to other required submittals, submit digitally-signed and sealed PDF electronic file of the certificate by the responsible design professional through the University PMIS.

G. Distribution: Electronic access to final submittals will be provided through the University PMIS to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

H. Use for Construction: Use University PMIS as the system of record for all submittals used on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.8 CONTRACTOR'S REVIEW OF SUBMITTALS

A. Contractor's Review of Submittals: Collect complete submittal documentation from the Sub/Manufacturer, create the Submittal Package, and assign Submittal Items to it. Each Submittal Item shall be reviewed by the contractor prior to submission to Architect for review,

-
1. The contractor and associated subcontractors are responsible for reviewing and verifying the submittal is complete and complies with all the requirements of the construction documents. If the submittal does not comply, the contractor shall identify the deficiencies and promptly return the submittal to the vendor for correction. If the incomplete or incorrect submittal is forwarded on to the A/E and/or UMB, the contractor is responsible for any cost issues resulting from re-processing the submittals.
- B. Include one Submittal Identification Form for each Submittal Item. The Contractor shall certify that submittals have been reviewed and approved and mark on form. Mark each Submittal Item with a uniform approval stamp including the name of the reviewer and the date of the Contractor's approval and sign each Submittal Item in the designated location on the form. Submittals without stamp and signature will not be reviewed and will be returned. Electronic signatures are acceptable.
- C. Contractor's submittal approval certifies the following actions have been completed by the Contractor:
1. Field measurements have been determined and verified.
 2. Conformance with requirements of Contract Drawings and Specification is confirmed.
 3. Catalog numbers and similar data are correct and indicated with arrow or highlighting; items not used, but on same page shall be crossed out.
 4. Work being performed by various subcontractors and trades is coordinated.
 5. Field construction criteria have been verified, including confirmation that information submitted has been coordinated with the work being performed by others for the University and actual site conditions.
 6. All deviations from requirements of Drawings and Specifications have been identified and noted.
- D. Submittals not certified by being stamped and signed by Contractor electronically on the Submittal Identification Form will be returned without action, as will submittals which, in the Architect's opinion, have not been adequately reviewed and coordinated by Contractor.
- E. Changes in Work: Changes in the Work shall not be authorized by submittal review actions. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written direction from the University, in accordance with the Contract General Conditions. However, to minimize the ordering of incorrect equipment/parts, notes may indicate forthcoming changes via CDC.

- F. Submittal Comments: Submittal comments entered on the submittal by the Supplier, CM / Contractor, shall follow the assigned color codes:

1. Supplier, CM / Contractor: Dark Green

1.9 REVIEW OF SUBMITTALS BY ARCHITECT AND UNIVERSITY

- A. Review of Submittals by Architect and University:

1. Reviews by University, Architect and Architect's consultants are for general conformance with the design concept of the Project and general compliance with the information given in the Drawings and Specifications.
2. The Architect's review shall not be construed as an "approval," or to relieve the Contractor(s) and material suppliers of responsibility for errors or omissions in the submitted documents.
3. Acceptance of a specific item does not include acceptance of the assembly of which the item is a component.
4. Architect will review each submittal, mark to indicate action taken, and return promptly via the web-based software (University PMIS) system.
 - a. Exception: Submittals for record, information or similar purposes

- B. Architect's Review Action: Architect will mark each submittal with a uniform, self-explanatory action. Architect's action may use a stamp on the Submittal Identification Form and may also include a separate review sheet on Architect's standard form following the Submittal Identification Form.

1. When review is made by a subconsultant to determine action taken, architect remains responsible for marking final review action.

<The below listing of submittal actions are the University standard stamp action and the abbreviation/notation for University PMIS. If A/E's stamp abbreviation/notations differ provide the equivalent as highlighted below.>

2. Submittal will be appropriately marked as follows to indicate the action taken:
 - a. **Action 1 APP** (no exceptions taken): Fabrication, manufacture, or construction may proceed providing submittal complies with Contract Documents.
 - 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
 - b. **Action 2a AAN** (note markings; no resubmission required): Fabrication, manufacture, or construction may proceed providing submittal complies with additional Architect's review notations and Contract Documents. (Note: If Contractor cannot comply with notations, make revisions and resubmit.)
 - 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
 - c. **Action 2b RFR** (note markings/resubmit for record): Fabrication, manufacture, or construction may proceed; however, submittal did not fully demonstrate full extent of all conditions, details and coordination with other surrounding work. Update submittal with required additional information and

-
- rework as noted and resubmit for record. Should Contractor proceed with fabrication, manufacturing or construction, it shall do so at its own risk.
- 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
- d. **Action 3 A&R** (amend and resubmit): This is the equivalent to R&R (revise and resubmit): Submittal does not comply with design intent of Contract Documents. Do not use submittals stamped Action 3. Make revisions and resubmit.
- 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
- e. **Action 4 REJ** (rejected, submit specified item or resubmit with related assembly items): Submittal varies significantly from specified item or system specified in Contract Documents and is not acceptable for use on the project. Do not use submittals stamped Action 4. Make revisions and resubmit.
- 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
- f. **Action 6 NAR** (no action required): Documents have not been reviewed by Architect and submittal is returned to Contractor for several possible reasons: submittal not requested, submittal not complete, Submittal Transmittal form is not included, submittal not coordinated, or submittal bears no resemblance to design intent. Architect shall identify which reason is applicable on form.
- 1) Equivalent to Architect's stamp Action **<Insert Note Here>**.
3. Do not permit submittals marked "Rejected, or Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
4. Any work performed prior to receiving a fully approved submittal shall be done at the Contractor's risk and shall be subject to being replaced if Contract requirements are not met.
5. Submittal Comments: Submittal comments entered on the submittal by Consultant (A/E), shall follow the assigned color codes:
- a. Consultant (A/E): Red
- C. University Review: University Review: The University will note review of the submittal on the Submittal ID sheet and upload the submittal to University PMIS.
1. Submittal Comments: Submittal comments entered on the submittal by UMB Personnel shall follow the assigned color codes, as follows:
- a. UMB: Blue
- D. Final Review Action: After receiving University Review notes, the Architect will provide final Action for the submittal and return stamped submittal to the Contractor.
- E. Contractor Action: The Contractor will be notified through University PMIS that the submittal is ready for their action. The Contractor shall incorporate all review comments and resubmit if required by the University PMIS and Architect's actions and markings.
- F. Contract Requirements:
-

1. Review actions by Architect and Architect's consultants or the University do not relieve the Contractor from compliance with requirements of the Contract Drawings and Specifications.
2. Acceptance of submittals with deviations do not relieve Contractor from responsibility for additional costs of changes required to accommodate such deviations.
3. Deviations included in submittals without prior written acceptance shall not be considered approved, regardless of whether such deviations are identified in review comments or in the returned submittal.
4. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions.
5. When professional certification of performance criteria of materials, systems or equipment is required by Contract Documents, the Architect shall be entitled to rely upon accuracy and completeness of such calculations and certifications.

G. Resubmittals are subject to same terms and conditions as original submittal.

1. The University will not accept excessive resubmittals.
2. Provide a summary of changes made to revised submittal from the previous submission.
3. Should excessive resubmittals be required, Contractor may be subject to reimburse the University for Architect's costs for time spent in processing additional resubmittals at their contractual hourly rate.

1.10 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment included in the specification section.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, generate specific shop drawings for the submittal, and identify as product data.
2. Mark each submittal to show which products and options are applicable. Clearly indicate all aspects of the proposed items, including material selections and all options specified. Failure to indicate such details could result in the submittal being returned as incomplete.
3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency, including credentials.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.

-
- h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - B. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements as shown in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 - 2. University PMIS: Submit each submittal as a single PDF file through the University PMIS, with any scaled drawings capable of being printed as a full-size drawing.
 - C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Sample Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Transmittal: Provide Submittal Identification Form and include complete submittal information indicated. Include photos of actual sample with sample identification label clearly shown as well as any illustrating sample characteristics and sample identification information for record.
 - 4. University PMIS: Prepare transmittal in PDF form, and upload to University PMIS. Enter required data in University PMIS to fully identify submittal.

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5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as University's property, are the property of Contractor.
 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return one set with options selected.
 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
 - a. Samples include, but are not limited to, the following:
 - 1) partial sections of manufactured or fabricated components;
 - 2) small cuts or containers of materials;
 - 3) complete units of repetitively used materials;
 - 4) swatches showing color, texture, and pattern;
 - 5) color range sets; and
 - 6) components used for independent testing and inspection.
 - b. Number of Samples: Submit two sets of Samples. Architect will retain one Sample set; remainder will be returned. Retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule (when required or applicable): As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. This may be submitted with the Product Data if all items on the schedule are included in the Product Data package. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
-

2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare and submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and University, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:

Edit for project. Identify specific certificates required for the project.

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:

Edit for project. Identify specific reports required for the project and whether they are Action or Information submittals.

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of

- compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.
 7. Corrective Action Report: Testing agency shall submit written documentation of any defects found and any corrective action taken, or proposed solutions.

I. Resubmission Summary:

1. Provide summary of changes from previous submission.
2. Include responses to review comments from previous submission.

DELETE SECTION BELOW IF IT DOES NOT APPLY

1.11 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

DELETE PARAGRAPH BELOW IF IT DOES NOT APPLY

- C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.
 1. Prepare delegated-design drawings in the same digital data software program, version, and operating system as original Drawings

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 Provide bookmarks in submittal PDF as follows:

- A. Submittal Bookmark Example: The following bookmark example is based on using an outline type arrangement with each line linked to the appropriate submittal page. Match Table of Contents:
 - a. UMB Submittal Identification Form
 - b. CM/Contractor Transmittal
 - c. CM/Contractor Replies (Resubmittal Only)
 - d. Consultant's Comments
 - e. Manufacturer's Transmittal
 - f. Manufacturer's Replies (Resubmittal Only)
 - g. Product Data
 - 1) Product A (Example for A: 2.2 Shut Off Valves)
 - 2) Product B (Example for B: 2.4 Check Valves)
 - 3) Product C (Example for C: 2.5 Special Valves)
 - h. Fabrication Drawings
 - i. Drawing 1
 - j. Drawing 2
 - k. Drawing 3

END OF SECTION

SECTION 014000 – QUALITY REQUIREMENTS

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, University, [**Commissioning Authority,**]
[**Construction Manager,**] or authorities having jurisdiction are not limited by provisions of this Section.

<Include if project includes a Statement of Special Inspections. Usually provided if there are critical structural elements>

- 4. Statement of Special Inspections is provided in SECTION <Add reference>

<DELETE IF NOT APPLICABLE TO SPECIFIC PROJECT>

1.2 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to University.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.
 1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor may perform testing by its own workforce. The Contractor shall employ and pay a qualified independent testing agency to perform quality-control services for the following list of testing requirements: Costs for these services are included in the Contract Sum.
 2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the University's responsibility, the University will engage the services of a qualified independent testing agency to perform those services.
 - a. <Edit if applicable> Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders.
 - b. Where the University has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the University, unless agreed to in writing by the University.
- B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
 1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
- C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the

agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

<EDIT LIST FOR SPECIFIC MATERIALS SUCH AS CONCRETE.>

3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site

D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the University and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the University and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the University regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to University for clarification before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to University for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel and testing agencies.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.6 INFORMATIONAL SUBMITTALS

<EDIT LIST OR DELETE IF NONE OF THE LISTED SYSTEMS APPLY...>

- A. Contractor's Statement of Responsibility: When required, submit copy of written statement of responsibility before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Permits, Licenses, and Certificates: For University's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents

established for compliance with standards and regulations bearing on performance of the Work.

- C. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to the University and Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

<Adjust for specific project>

- A. Quality-Control Plan, General: If project is more than a million, submit a quality-control plan within [10] <Insert number> days of [Notice of Award] [Notice to Proceed], and not less than [5] <Insert number> days prior to preconstruction conference. For projects less than a million, the University reserves the right to request a quality-control plan. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate University's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- C. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. University-performed tests and inspections indicated in the Contract Documents[, including tests and inspections indicated to be performed by Commissioning Authority].
- D. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to

bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

- E. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work that the University or Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

<EDIT FOR SPECIFIC PROJECT>

1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections.
 - C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections.

1.9 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage qualified inspection and testing service agencies, including independent testing laboratories, that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

<Edit if Mockups are included in project>

- B. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect **[or Construction Manager]**.
3. Notify Architect **[and Construction Manager]** **[seven]** **<Insert number>** days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's **[and Construction Manager's]** approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow **[seven]** **<Insert number>** days for initial review and each re-review of each mockup.
7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

<Edit if project includes Specialty Mockups and project includes spec section 014339>

- C. Specialty Mockups: See Section 014339 "Mockups" for additional construction requirements for **[integrated exterior mockups]** **[preconstruction laboratory mockups]** **[and]** **[room mockups]**.

1.10 QUALITY CONTROL

- A. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel.
 - 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by University, unless agreed to in writing by University.
- B. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to University and Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's [, Commissioning Authority's,][and Construction Manager's] [and] [authorities' having jurisdiction] reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

END OF SECTION

SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. **<EDIT FOR PARTICULAR PROJECT>**
- B. Temporary utilities include, but are not limited to, the following: **<EDIT FOR PARTICULAR PROJECT>**
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat.
 - 4. Ventilation.
 - 5. Telephone service.
 - 6. Sanitary facilities, including drinking water.
 - 7. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following: **<EDIT FOR PARTICULAR PROJECT>**
 - 1. Field offices and storage sheds.
 - 2. Temporary roads and paving.
 - 3. Dewatering facilities and drains.
 - 4. Temporary enclosures.
 - 5. Hoists and temporary elevator use.
 - 6. Temporary project identification signs and bulletin boards.
 - 7. Waste disposal services.
 - 8. Rodent and pest control.
 - 9. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following: **<EDIT FOR PARTICULAR PROJECT>**
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.

3. Sidewalk bridge or enclosure fence for the site.
4. Environmental protection.

1.2 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within fifteen (15) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.
- C. Site Logistics Plan:
 1. Prepare a comprehensive, project-specific Site Logistics Plan to graphically illustrate site access, circulation, safety measures, and temporary facilities necessary to support construction activities.
 2. Develop the Site Logistics Plan in collaboration with the University's Project Manager and the Fire Marshal and update as required throughout the duration of the project.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 1. Building code requirements.
 2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, fire department, and rescue squad rules.
 5. Environmental protection regulations.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the University, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 MATERIALS <EDIT MATERIALS REQUIRED FOR PARTICULAR PROJECT, DEPENDING ON TYPE OF TEMPORARY CONSTRUCTION>

- A. General: Provide new materials. If acceptable to the University, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended. <COORDINATION WITH OTHER SECTIONS.>
- B. Lumber and Plywood: <EDIT LIST FOR PARTICULAR PROJECT.>
 - 1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
 - 2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
 - 3. For fences and vision barriers, provide minimum three eighths (3/8) inch- (9.5-mm-) thick exterior plywood.
 - 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum five eighths (5/8) inch- (16-mm-) thick exterior plywood.
- C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.
- D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.
- E. Paint: <EDIT LIST FOR PARTICULAR PROJECT.>

1. For job-built temporary offices, shops, sheds, fences, and other exposed surfaces and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
 2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
 3. For interior walls of temporary offices, provide two (2) coats interior latex-flat wall paint.
- F. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of fifteen (15) or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- G. Water: Provide potable water approved by local health authorities.
- H. Open-Mesh Fencing: Provide 0.120-inch- (3-mm-) thick, galvanized two (2) inch (50-mm) chain link fabric fencing six (6) feet (2 m) high with galvanized barbed-wire top strand and galvanized steel pipe posts, one and one half (1-1/2) inches (38 mm) I.D. for line posts and two and one half (2-1/2) inches (64 mm) I.D. for corner posts.

2.2 EQUIPMENT <EDIT EQUIPMENT REQUIRED FOR PARTICULAR PROJECT, DEPENDING ON TYPE OF TEMPORARY FACILITY>

- A. General: Provide new equipment. If acceptable to the University, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide three quarter (3/4) inch (19-mm), heavy-duty, abrasion-resistant, flexible rubber hoses one hundred (100) feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION <EDIT UTILITIES REQUIRED FOR PARTICULAR PROJECT, DEPENDING ON TYPE OF TEMPORARY FACILITY>

- A. General: Coordinate with the University Operations and Maintenance Personnel to install temporary service or connect to existing service. Provide all necessary labor, materials and equipment for connections.
 - 1. Coordinate with the University for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to the site where the University's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the University. The University will not accept cost or use charges as a basis of claims for Change Orders.
- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
 - 1. Sterilization: Sterilize temporary water piping prior to use.
- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
 - 1. Install electric power service underground, except where overhead service must be used.
 - 2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
 - 1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate

ventilation requirements to produce the ambient condition required and minimize consumption of energy.

- F. Heating Facilities: Except where the University authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
- G. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
 - 1. Separate Telephone Lines: Provide additional telephone lines for the following:
 - a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for a fax machine in the field office.
 - c. Provide a separate line for the University's use.
 - 2. At each telephone, post a list of important telephone numbers.
- H. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
 - 1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
- I. Toilets: **<EDIT BASED ON APPROVAL FROM UMB>** Use of the University's existing toilet facilities will be permitted, so long as facilities are cleaned and maintained in a condition acceptable to the University. At Substantial Completion, restore these facilities to the condition prevalent at the time of initial use.
- J. Toilets: **< EDIT BASED ON APPROVAL FROM UMB >** Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
 - 1. Provide separate facilities for male and female personnel.
- K. Wash Facilities: **<EDIT FOR PARTICULAR PROJECT>** Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
 - 1. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

- L. Sewers and Drainage: Provide temporary connections to remove effluent that can be discharged lawfully. If drainage facilities cannot be lawfully used for discharge of
 - 1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to the municipal system, as directed by Baltimore City sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- M. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 SUPPORT FACILITIES INSTALLATION **<COORDINATE WITH UMB TO DESIGNATE STAGING AREA AND AREA FOR FIELD OFFICES, ETC.>**

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access. **<EDIT FOR PARTICULAR PROJECT>**
 - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the University.
- B. Provide incombustible construction for offices, shops, and sheds **<EDIT FOR PARTICULAR PROJECT>** located within the construction area or within 30 feet (9 m) of building lines. Comply with requirements of NFPA 241.
- C. Field Offices: **<EXCLUDE WHEN FIELD OFFICE NOT PROVIDED>** Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:
 - 1. Furnish with a desk and chairs, a four (4) drawer file cabinet, plan table, plan rack, and a six (6) shelf bookcase.
 - 2. Equip with a water cooler and include a table and chairs for progress meetings, private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.
- D. Storage and Fabrication Trailers: **<EXCLUDE WHEN STORAGE TRAILERS NOT PROVIDED>** Install storage and fabrication trailers sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service.
- E. Temporary Paving: **<EDIT FOR PARTICULAR PROJECT>** Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand

exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the University.

1. Paving: Comply with Division 2 Section "Hot-Mixed Asphalt Paving" for construction and maintenance of temporary paving. **<COORDINATE WITH DIVISION 2>**
 2. Coordinate temporary paving development with sub grade grading, compaction, installation and stabilization of sub base, and installation of base and finish courses of permanent paving.
 3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the University.
 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- F. Dewatering Facilities and Drains: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. **<COORDINATE WITH DIVISION 2>** Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- G. Temporary Enclosures: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of twenty five (25) sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Where temporary wood or plywood enclosure exceeds one hundred (100) sq. ft. (9.2 sq. m) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

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- H. Temporary Lifts and Hoists: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Temporary Elevator Use:
1. Provide protection to maintain finishes.
 2. Contractors are responsible for any damage to elevators.
- J. Project Identification and Temporary Signs: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Prepare project identification and directional signs. Install signs outside the project area to identify Project entrance. Do not permit installation of unauthorized signs.
1. Submit project signs for approval by University PM.
 2. Coordinate sign material, size, and mounting requirements with University PM.
 3. Project Identification Signs: Comply with details provided by University PM.
 4. Temporary Directional Signs: Provide directional information to construction personnel and visitors.
- K. Temporary Exterior Lighting: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Install exterior yard and sign lights so signs are visible when Work is being performed.
- L. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven days during normal weather or three days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- M. Rodent and Pest Control: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- N. Stairs: **<DELETE IF NOT REQUIRED FOR PARTICULAR PROJECT>** Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
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Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the University.
- B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Smoking is not permitted anywhere on project sites.
 - 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- E. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.

<EDITOR TO SELECT ONE OF THESE>

- 1. Provide open-mesh, chain link fencing with posts set in a compacted mixture of gravel and earth.

2. Provide plywood fence, eight (8) feet (2.5 m) high, framed with four (4) 2 x 4-inch (50-by-100-mm) rails, and preservative-treated wood posts spaced not more than eight (8) feet (2.5 m) apart.
- F. Covered Walkway: Erect a structurally adequate, protective covered walkway for passage of persons along the adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
1. Construct covered walkways using scaffold or shoring framing. Provide wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage. Extend the back wall beyond the structure to complete the enclosure fence. Paint and maintain in a manner acceptable to the University.
- G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- H. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 CONTROLLED CONSTRUCTION PERIOD – MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.

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- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for [48] <Insert time period> hours are considered defective and require replacing.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for [48] <Insert time period> hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within [48] <Insert time period> hours.

3.6 DUST AND AIRBORNE PARTICULATE CONTROL

- A. General: Control dust, airborne particulates, and contaminants generated by construction activities to prevent migration beyond the Work area and to protect adjacent spaces, building systems, and occupants.
- B. Containment:

-
1. Provide temporary barriers, enclosures, and isolation of Work areas as required to limit dust migration.
 2. Seal penetrations, openings, and pathways that could allow airborne contaminants to escape the Work area.
- C. Pressure Control: Where Work occurs within existing or occupied buildings, provide negative air pressure within the Work area relative to adjacent spaces as required to prevent dust migration.
- D. Work Practices: Use methods and sequencing that minimize dust generation.
1. Employ wet methods, localized exhaust, or collection systems where feasible.
 2. Do not use dry sweeping or compressed air for cleaning dust-laden surfaces.
- E. Housekeeping:
1. Remove accumulated dust and debris daily or more frequently as required.
 2. Clean Work areas prior to removing temporary barriers.
- F. Protection of Building Systems: Protect HVAC systems, ductwork, diffusers, and returns from dust infiltration. Do not operate permanent HVAC systems serving occupied areas until Work areas are cleaned and dust sources are controlled.
- G. Enforcement: If dust migration occurs or containment measures are ineffective, immediately stop affected Work and implement corrective measures at no additional cost to the University.

3.7 NOISE AND VIBRATION CONTROL

- A. General: Conduct construction activities in a manner that minimizes noise and vibration impacts on adjacent spaces, building occupants, existing structures, and building systems.
- B. Noise Control:
1. Limit construction noise to levels consistent with local regulations and University requirements.
 2. Restrict high-noise operations to hours approved by the University.
 3. Use equipment with properly maintained mufflers, enclosures, and noise-reducing devices.
 4. Avoid unnecessary idling of equipment.
- C. Vibration Control:

1. Perform work in a manner that prevents damage to existing structures, finishes, utilities, equipment, and sensitive systems.
 2. Sequence work to limit vibration-producing activities where adjacent spaces are occupied or contain sensitive equipment.
 3. Do not use methods that generate excessive vibration without prior coordination with the University.
- D. Monitoring and Corrective Action: If noise or vibration levels result in complaints, disruption, or potential damage, modify operations immediately. Suspend affected work as directed until corrective measures are implemented.
- E. Damage Responsibility: Repair damage to existing construction, equipment, or finishes caused by construction-related noise or vibration at no additional cost to the University.

3.8 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty four (24) hour basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the University requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are the Contractor's property. The University reserves the right to take possession of project identification signs.
 2. Remove temporary paving not intended for or acceptable for in the University's opinion, integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that

might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.

3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION

SECTION 015639 – TEMPORARY TREE AND PLANT PROTECTION

Initial Issue Date: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of this Section includes protection, preservation, monitoring, relocation, replacement, and restoration of existing trees, shrubs, and green space affected by construction activities, whether impacts are temporary or permanent.
- B. Protection and preservation of trees and green space shall begin at project planning. Unnecessary removal of trees due to insufficient planning is not permitted.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site] <Insert location>**.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement with the locations of protection zones.
 - e. Trenching by hand or with air spade within protection zones.
 - f. Field quality control.
 - g. **<Insert additional agenda items>**.

1.3 ACTION SUBMITTALS

- A. Product Data:

1. Materials: Products used as part of protection plan and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent. Examples such as fencing and signage.

B. Shop Drawings:

1. Tree Protection Plan:
 - a. Identify Tree Protection Zones (TPZs), fencing limits, signage, access routes, staging areas, and protection measures. Coordinate with construction sequencing and site logistics.
 - b. Identify all trees proposed for removal, relocation, or replacement, by species, location, and anticipated replacement or restoration measures.
 - c. Indicate extent of utility boring and trenching by hand or with air spade within protection zones.
 - d. Include any existing irrigation system that will be used to water plants.
 - e. Detail scope and extent of tree pruning to remain that interfere with or are affected by construction.
2. Erosion and Sediment Control Plans
 - a. Any changes to project Erosion and Sediment Control Plans resulting from Tree Protection Plan.

<Edit Mitigation Requirements by Project>.

C. Mitigation Requirements

1. Local ordinances governing tree mitigation.
2. Standards established under the approved tree mitigation report developed by the arborist.
3. Maryland DGS Environmentally Preferable Purchasing Legislation, Statutes, and Regulations:
 - a. Environmentally Preferable Purchasing (COMAR 21.11.07.09)
 - b. Procurement – Invasive Plant Species – Prohibition on Use of State Funds (State Finance and Procurement Article § 14-417(a))
4. Prohibitions on Invasive Plants pursuant to Md. Code Ann., State Fin. and Proc. (SFP), § 14-417.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For arborist and tree service firm.

B. Existing Conditions Documentation: Documentation of existing trees and plantings indicated to remain, relocate, or be removed, establishing preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. This may be submitted as part of shop drawing submittal.
 2. Use sufficiently detailed photographs.
 3. Include plans identifying tree locations, species, approximate size, and any existing wounds or damage conditions of each tree or plant designated to remain.
- C. Post Construction Final Certification: From arborist certifying that trees indicated to remain have been protected during construction in accordance with recognized standards and that trees were promptly and properly treated and repaired when damaged.
- D. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

1.5 QUALITY ASSURANCE

- A. Arborist Qualifications: All tree protection, pruning, relocation, and mitigation activities shall be overseen by a Certified Arborist or a Maryland Licensed Tree Expert experienced in similar institutional projects.
- B. Tree-Service Firm Qualifications: An experienced tree-service firm that has successfully completed temporary tree- and plant-protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. University Oversight: All tree protection, relocation, restoration, and replacement activities are subject to review and approval by University Environmental Services and the Office of Sustainability.

1.6 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:

<Revise subparagraphs below to suit Project.>

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.
- D. Take precautions to protect plants from airborne contaminants, such as paint or fireproofing overspray.

1.7 PRE-CONSTRUCTION REQUIREMENTS

- A. Site Evaluation and Preparation: Prior to start of construction, perform a site audit to identify existing trees and green space to be affected. Identify Tree Protection Zones (TPZs), root protection limits, and trees proposed for relocation or removal.
- B. Planning for Preservation: Relocation or preservation of trees shall be evaluated prior to approval of removal. Trees shall not be removed solely for contractor convenience or due to insufficient construction planning.

PART 2 - PRODUCTS

2.1 MATERIALS <Revise for specific project>

- A. Backfill Soil: [Stockpiled soil from location indicated on Drawings] [Stockpiled soil mixed with planting soil] [Planting soil] of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
 1. Mixture: Well-blended mix of [2 parts stockpiled soil to 1 part planting soil] <Insert requirement>.
 2. Planting Soil: Planting soil <Insert drawing designation> as specified in [Section 329113 "Soil Preparation"] [Section 329115 "Soil Preparation (Performance Specification)."]
- B. Organic Mulch:

1. Comply with Maryland Green Purchasing Committee Approved Specification– Mulch requirements
2. Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
3. Type: [Shredded hardwood] [Ground or shredded bark] [Wood and bark chips] <Insert mulch type>.
4. Size Range: [3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum] <Insert size range>.
5. Color: Natural. <Revise for specific project>

C. Protection-Zone Fencing: Fencing and gates.

<Architect to edit section to include specific fence requirements.>

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes; legibly printed with nonfading lettering.

PART 3 - EXECUTION <Revise to suit project>

3.1 EXAMINATION

- A. Site Verification: Examine site conditions prior to installation of tree and plant protection measures to verify locations, limits, and existing conditions of trees, shrubs, and plantings to remain, relocate, or be removed.
- B. Erosion and Sedimentation Control: Verify that temporary erosion- and sedimentation-control measures are in place and functioning prior to installation of tree protection measures. Ensure runoff from construction activities does not enter or cross Tree Protection Zones (TPZs).
- C. Detrimental Conditions Report: Prepare a written report identifying any site conditions detrimental to tree and plant protection. Do not proceed with Work affecting protected vegetation until conditions have been corrected.

3.2 PREPARATION

- A. Plant Identification: Prior to start of construction activities identify all trees, shrubs, and plantings as to remain, relocate, or be removed.

1. Mark trees to remain and trees to be relocated in a manner that remains visible throughout construction.
2. Coordinate identification with Tree Protection Plan and approved submittals.

B. Coordination

1. Coordinate work with University landscaping contractor and O&M representatives.
2. Coordinate tree and plant protection activities with construction sequencing, access routes, staging areas, and utility work to prevent damage to protected vegetation.

3.3 TREE PROTECTION DURING CONSTRUCTION

A. Tree Protection Zones (TPZs): Establish Tree Protection Zones prior to mobilization and maintain for the duration of construction.

1. Install chain-link fencing around TPZs in locations indicated on approved Tree Protection Plan.
2. Where fencing is not feasible, install mulch or gravel mulch over geotextile fabric to prevent soil compaction.
3. Maintain TPZs free of construction activities except as specifically approved by the University.

B. Prohibited Activities: The following activities are prohibited within TPZs unless specifically approved by the University:

1. Storage of materials, equipment, or debris.
2. Parking or operation of vehicles or machinery.
3. Grade changes, excavation, or soil compaction.
4. Attachment of signs, fencing, or materials to trees.
5. Discharge of chemicals, concrete washout, fuels, or solvents.

C. Temporary Access Exception: If temporary access or laydown within a TPZ is unavoidable:

1. Materials shall be placed no closer than two feet from tree root buttress flares.
2. Materials shall remain no longer than 24 hours.
3. Provide additional root protection measures as directed by the arborist.
4. Obtain prior approval from the University.

3.4 SOIL PROTECTION AND ROOT ZONE MANAGEMENT

A. Soil Protection: Protect soils within TPZs from compaction, contamination, erosion, and excessive moisture.

- B. Root Zone Protection: Protect tree root systems from damage caused by runoff, ponding, dewatering operations, or spillage of noxious materials.
- C. Soil Restoration: Where construction activities impact soil chemistry or structure, restore soils to suitable conditions for plant health.
 - 1. Restore soil pH to a range of 6.0 to 6.5 unless otherwise approved by the University.
 - 2. Replace or amend soils as required to support long-term viability of protected vegetation.

3.5 FENCING AND TRUNK PROTECTION

- A. Protection-Zone Fencing: Install fencing as indicated on approved submittals prior to bringing materials or equipment onto the site.
 - 1. Maintain fencing in an upright, secure condition throughout construction.
 - 2. Repair or replace damaged fencing immediately.
- B. Trunk Protection: Where trees are subject to potential impact, install trunk protection assemblies as required.
 - 1. Protect trunks from abrasion, impact, and equipment contact.
 - 2. Maintain trunk protection until risk of damage has passed.

3.6 EXCAVATION AND TRENCHING NEAR PROTECTED VEGETATION

- A. General: Perform excavation near TPZs in a manner that minimizes damage to roots and soil structure.
- B. Trenching within TPZs: Where trenching within a TPZ is unavoidable:
 - 1. Excavate by hand or with air spade, tunneling, or approved low-impact methods.
 - 2. Do not cut main lateral roots or taproots.
 - 3. Prune roots cleanly using sharp tools as directed by the arborist.
 - 4. Protect exposed roots from drying and backfill as soon as practicable.

3.7 TREE PRUNING AND REPAIR

- A. Pruning: Prune trees only where necessary to accommodate construction activities and only under supervision of the arborist.

- B. Repair of Damage: Promptly repair damage to trees or plants caused by construction activities in accordance with arborist recommendations.

3.8 TREE RELOCATION, REMOVAL, AND REPLACEMENT

- A. Tree Relocation: Trees up to eight (8) inches in caliper are generally considered transplantable and shall be prioritized for relocation where feasible.
- B. Tree Removal: Remove trees only after approval by the University. Removal for contractor convenience or due to avoidable planning conflicts is not permitted.
- C. Replacement Requirements: Where relocation is not feasible, provide replacement trees.
 - 1. Replacement species shall be non-invasive, native to Maryland, and consistent with Maryland Department of General Services landscaping standards or otherwise approved by the University.
 - 2. Replacement quantities shall be determined using a Trunk Area Replacement (TAR) methodology equivalent to or consistent with the NYC Tree Valuation Protocol.

3.9 MONITORING AND QUALITY CONTROL

- A. Monitoring: Monitor tree protection measures throughout construction to ensure continued compliance.
- B. Corrective Actions: Immediately correct deficiencies or damage identified by the arborist or University at no additional cost to the University.
- C. Notification: Notify University immediately of any damage to trees and plants or tree protection area boundaries.

3.10 RESTORATION AND CLOSEOUT

- A. Restoration: Restore disturbed areas and vegetation to conditions equal to or better than preconstruction conditions.
- B. Cost Responsibility: Include all costs for tree protection, relocation, replacement, soil remediation, and restoration in the Contract Sum.

- C. Final Certification: Submit certification from the arborist confirming compliance with tree protection requirements and completion of required restoration.

END OF SECTION 015639

SECTION 016000 – PRODUCT REQUIREMENTS

Latest Update: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements governing product selection, quality, compatibility, delivery, storage, handling, and installation coordination for products incorporated into the Work.
- B. This Section establishes administrative and procedural requirements applicable to products specified throughout the Contract Documents, including but not limited to:
 - 1. Product selection and compliance with specified requirements.
 - 2. Basis-of-Design and comparable product requirements.
 - 3. Visual selection and visual matching requirements.
 - 4. Quality and source limitations.
 - 5. Delivery, storage, handling, protection, and identification of products.
- C. Requirements for substitutions, submittals, warranties, closeout documentation, and contract modifications are specified in other applicable Division 01 Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Product Compliance: Provide products that comply with the Contract Documents and are new, undamaged, and suitable for the intended use at the time of installation.
- B. Coordination: Coordinate product selection, ordering, delivery, storage, handling, and installation with the progress of the Work and with related construction activities to prevent delays, conflicts, and damage.
- C. Responsibility: Selection of products, including selection among specified options and preparation of comparable product requests, is the Contractor's responsibility unless specifically indicated otherwise.

1.3 QUALITY REQUIREMENTS

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 - 1. When specified products are available only from sources that cannot produce quantities adequate to meet Project requirements in a timely manner, consult with the University to determine the most important product qualities prior to proceeding.
 - 2. Product qualities may include, but are not limited to, visual appearance, strength, durability, compatibility, serviceability, and performance.
- B. Compatibility of Options: When the Contract Documents permit selection between two or more products or options, select products that are compatible with products previously selected, even if previously selected products were also options.
- C. Buy American Steel:
 - 1. Only steel products made in the United States shall be used or supplied in the performance of the Contract or any Subcontract. Steel products include products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed from steel made in the United States.
 - 2. This requirement shall not apply if the University has determined that the cost of such steel products is unreasonable or inconsistent with the public interest and has communicated this determination in writing to the Contractor.
 - 3. The provisions of this Section shall not apply where they are in conflict with any Federal grant or regulation affecting this Contract.

1.4 PRODUCT IDENTIFICATION

- A. Labels and Nameplates:
 - 1. Do not attach or imprint manufacturer's nameplates, trademarks, or identifying markings on exposed surfaces of products that will be visible in occupied spaces or on exterior surfaces, except where required by governing codes or standards.
 - 2. Locate required labels, stamps, and nameplates on concealed or inconspicuous surfaces where practicable.
- B. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate nameplates on accessible but inconspicuous surfaces. Nameplates shall include essential operating data, including manufacturer, model number, serial number, and ratings.

PART 2 - PRODUCTS

2.1 ~~2.1~~ PRODUCT SELECTION REQUIREMENTS

A. ~~A.~~ General:

1. Provide products complete with accessories, trim, finishes, safety devices, and other components required for a complete and functional installation.
2. Where available, provide standard products that have been produced and used successfully in similar applications on other projects.
3. Where products are identified by the phrase *as selected*, the University will make the selection.
4. Where products are identified by the phrase *match sample*, match the University's sample.

B. Compliance with Requirements: Compliance requirements indicated in the Contract Documents may include descriptive, performance, reference standard, and graphic requirements. All applicable requirements shall be satisfied.

C. Contractor Options: The Contractor's options for selecting products are limited by the requirements of the Contract Documents and are not governed by industry customs or practices used on other projects.

2.2 PRODUCTS SPECIFIED BY REFERENCE OR NAMING

A. Products Specified by Reference Standards, Codes, or Regulations: Select products that demonstrably comply with referenced standards and regulatory requirements.

B. Products Specified by Naming Manufacturers: Where manufacturers are named, select products from among those listed, subject to compliance with the Contract Documents.

C. Basis-of-Design Products:

1. Where the Contract Documents identify a single product as the Basis-of-Design and reference other manufacturers, provide either the specified Basis-of-Design product or an approved comparable product manufactured by one of the referenced manufacturers.
2. Approval of a comparable product is subject to compliance with requirements in Article 2.3.

D. Approved Equivalent Language: Where the Contract Documents permit selection of an "approved equivalent" or similar language, provide either the specified product or an

approved comparable product manufactured by another manufacturer, subject to compliance with Article 2.3.

2.3 COMPARABLE PRODUCTS

- A. General: Requests to use comparable products shall be submitted in accordance with the Submittal Procedures and Substitution requirements specified elsewhere in Division 01.
- B. Comparable Product Requests shall include, at a minimum:
 - 1. Evidence that the proposed product is consistent with the Contract Documents and does not require extensive revisions.
 - 2. A detailed comparison of significant qualities of the proposed product and the specified Basis-of-Design product, including performance, durability, size, weight, serviceability, visual effect, and specific features.
 - 3. Evidence that the proposed product provides warranties meeting the requirements of the Contract Documents.
 - 4. Documentation of similar completed installations, when requested.
 - 5. Samples, when requested.
- C. Approval of a comparable product does not relieve the Contractor of responsibility for compliance with the Contract Documents.

2.4 VISUAL SELECTION AND MATCHING

- A. Visual Matching: Where the Contract Documents require matching an established sample, provide a product that complies with specified requirements and matches the University's sample. The University's determination of acceptable match shall be final.
- B. Visual Selection:
 - 1. Where products are specified as "*selected from manufacturer's standard range,*" selections shall be made from non-premium options unless otherwise indicated.
 - 2. Where products are specified as "*selected from full range,*" selections may include both standard and premium options.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products in accordance with manufacturer's written instructions using methods that prevent damage, deterioration, loss, or theft.
- B. Schedule deliveries to minimize long-term on-site storage and avoid overcrowding of construction areas.
- C. Coordinate delivery with installation to minimize holding time for products that are flammable, hazardous, easily damaged, or sensitive to environmental conditions.
- D. Deliver products to the Project site in original, unopened, and undamaged packaging with labels and instructions intact.
- E. Inspect products upon delivery for compliance with the Contract Documents and for damage. Remove damaged or nonconforming products from the site.
- F. Store products to facilitate inspection and measurement and to prevent damage to the Project structure.
- G. Store products subject to weather damage under cover in weather-tight enclosures with ventilation, temperature, and humidity controlled as required by manufacturer's instructions.

3.2 INSTALLATION OF PRODUCTS

- A. Install products in accordance with manufacturer's written instructions and recommendations and in coordination with related Work.
- B. Anchor products securely in place, accurately located and aligned with adjacent construction.
- C. Clean exposed surfaces and protect products as required to ensure acceptable condition at Substantial Completion.

END OF SECTION

SECTION 017300 – EXECUTION

Initial Issue Date: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
1. Construction layout.
 2. Field engineering.
 3. Installation.
 4. Cutting and patching.
 5. Coordination of University's portion of the Work.
 6. Progress cleaning.
 7. Starting and adjusting.
 8. Protection of installed construction.
 9. Correction of the Work.

1.2 University-Retained and Historically Significant Items <Delete if not needed>

A. General

1. Items of historical, commemorative, archaeological, or institutional value to the University that are uncovered, encountered, removed, or affected during execution of the Work remain the property of the University.
2. Such items may include, but are not limited to:
 - a. Cornerstones and contents
 - b. Plaques, tablets, inscriptions, and memorial elements
 - c. Artifacts, time capsules, or markers
 - d. Architectural features designated by the University

B. Protection and Notification

1. Upon discovery of such items, immediately cease work in the affected area.
2. Protect items from damage, loss, or deterioration.
3. Promptly notify the University and await further direction before resuming work in the affected area.

C. Handling and Disposition

1. Do not discard, alter, or remove items except as directed by the University.
2. Handle, salvage, store, and deliver items as directed, using methods that prevent damage.
3. Coordinate handling and delivery with the University's designated representative.

1.3 ACTION SUBMITTALS

A. Cutting and Patching Proposal: When unforeseen conditions require cutting and patching of the existing structure and/or related components the CM shall submit a cutting and patching proposal to the university, for review and approval before proceeding with any work. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and indicate why it cannot be avoided. Include changes to the building's appearance and other significant visual elements if applicable.
2. Describe the products to be used.
3. Identify the impact to the project's schedule and budget.
4. Indicate the dates when cutting and patching will be performed.
5. Where cutting and patching involves adding reinforcement to structural elements, the modifications to the structure shall be designed by a registered structural engineer. If the design team does not include a structural engineer the CM shall secure the services of an engineer to perform the required design. The CM shall submit the design drawings, details and engineering calculations showing integration of reinforcement with the original structure to the University.
6. Approval by the University to proceed with cutting and patching does not waive the University's right to later require complete removal and replacement of unsatisfactory work.

1.4 CLOSEOUT SUBMITTALS <Delete if not applicable>

A. Final Property Survey: Submit electronic final property survey files showing the Work performed and record survey data through the University's Project Management Information System (PMIS).

1.5 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Obtain hot work permit from the University for cutting, burning, welding, etc. (See attached).

-
2. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements: **<Edit For Particular Project>**
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction in Division 13 Sections.
 - B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 1. Obtain approval of the cutting and patching proposal from the University before cutting and patching the following operating elements or safety related systems: **<Edit For Particular Project>**
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 - l. Fire rated assemblies.
 - C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the University's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner when directed by the University.

1. If possible, retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.

<Edit For Particular Project>

- a. Processed concrete finishes.
- b. Stonework and stone masonry.
- c. Ornamental metal.
- d. Matched-veneer woodwork.
- e. Preformed metal panels.
- f. Firestopping.
- g. Window wall system.
- h. Stucco and ornamental plaster.
- i. Acoustical ceilings.
- j. Terrazzo.
- k. Finished wood flooring.
- l. Fluid-applied flooring.
- m. Carpeting.
- n. Aggregate wall coating.
- o. Wall covering.
- p. HVAC enclosures, cabinets, or covers.

D. Cutting and Patching Responsibilities:

1. Cutting: cutting shall be the work of the trade requiring the cutting for access, or for permitting the alteration to be performed or an approved subcontractor designated by the trade or the CM.
 - a. Cutting required for inspections shall be the work of the CM/GC.
 - b. Cutting required to obtain test samples of suspected hazardous materials shall be the work of a contractor licensed for the removal of hazardous materials.
2. Patching: Patching shall be the work of the appropriate trade.
 - a. Maintain the rating of fire rated barriers, using approved sealant products.

E. Fire Rated Barriers: Where existing fire rated barriers, located in the project area, have unsealed openings for mechanical and electrical work, these openings shall be sealed using the approved sealant products to maintain the fire rating of the barrier.

F. Manufacturer's Installation Instructions: Obtain and maintain manufacturer's written recommendations and instructions for installation of specified products and equipment. Provide electronic access to these instructions through the University's Project Management Information System (PMIS); hard copies may also be provided where necessary for field use.

- G. Original Installer / Specialized Firms: Where feasible, retain the original installer or fabricator to perform cutting and patching of exposed work. Where the original installer is unavailable, engage a recognized, experienced, and specialized firm for the work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

1. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. For building exterior or visible interior elements, the Architect and the UMB representative must approve substitutions. Use materials whose installed performance will equal or surpass that of existing materials. Refer to applicable spec sections for materials.
2. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

2.2 ROOFING SYSTEMS <Delete if not Required>

A. Where existing roofing systems require alterations due to unforeseen conditions, all required alterations shall be provided by a roofing contractor approved by the manufacturer of the existing roofing system.

PART 3 - EXECUTION

3.1 CONSTRUCTION WORK – EXCESSIVE NOISE

- A. All construction work that creates excessive noise and vibration will not be permitted during normal business hours, 8:00am to 5:00pm (M-F) or 8:00am to 8:00pm (weekends). Work such as core drilling floors, cutting masonry construction or other materials, or

inserting hangers in floor slabs shall be scheduled between 5:00am and 8:00am (M-F) or 10:00pm to 8:00am (weekends). Coordinate actual time frames with UMB – Project Manager.

3.2 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
- B. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.3 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them or to take them out of service.

3.4 PERFORMANCE

- A. General: Employ skilled workmen or experienced subcontractors to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

<Edit For Particular Project>

1. In general, when cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Ensure all services have been de-energized or drained before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

<Edit For Particular Project>

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat. Prepare entire surface to receive final coat as necessary for proper adhesion. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- D. Plaster Installation: <Delete If Not Applicable to Project> Comply with manufacturer's instructions and install thickness and coats as indicated.

1. Unless otherwise indicated, provide three (3) coat work.
2. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arises.
3. Cut, patch, point-up, and repair plaster to accommodate other construction.

3.5 PAINTING

A. Extent of Painting:

1. Paint over the entire surface plane, unless otherwise noted.
2. Over patched surfaces paint to the nearest cut off line for the entire surface, such as the intersection with adjacent wall, ceiling, beam, bulkhead, or to the nearest opening frame where a total cut off does not occur within ten (10) feet of the patch, unless otherwise noted.

B. Appearance and Finish:

1. Appearance: Ensure painted surfaces do not present a spotty, touched-up appearance.
2. Finish: Provide a smooth continuous surface in texture, coverage and color.

3.6 CLEANING

- #### A.
- Areas and spaces where cutting, and patching are performed shall be cleaned. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

Initial Issue Date: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging non-hazardous waste.
2. Recycling non-hazardous waste.
3. Disposing of non-hazardous waste.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, construction waste becomes property of Contractor.

1.3 ACTION SUBMITTALS

A. Construction Waste Management Plan: Submit a project-specific Construction Waste Management Plan prior to commencement of construction activities that generate construction waste.

1. The Construction Waste Management Plan shall include the following:
 - a. Identification of anticipated construction waste streams generated by the Work.
 - b. Methods for salvage, recycling, and disposal of construction waste.
 - c. On-site handling, separation, storage, and transportation procedures.
 - d. Identification of responsibilities for implementation and monitoring.
 - e. Alignment of waste categories and reporting units with the UMB Construction & Demolition Waste Reporting Log. Copies are available on the Design & Construction website.
2. Construction activities generating construction waste shall not proceed until the Construction Waste Management Plan has been reviewed.

1.4 INFORMATIONAL SUBMITTALS

A. Construction Waste Reporting:

1. UMB Construction & Demolition Waste Reporting Log (Excel): Use the UMB Construction & Demolition Waste Reporting Log to report construction waste generated by the Work.
2. Progress Submissions: Submit an updated Waste Reporting Log with each Application for Payment. Logs shall reflect cumulative construction waste quantities to date.
3. Supporting Documentation: Provide weight tickets, hauling manifests, receipts, invoices, or equivalent documentation supporting all reported construction waste quantities. Documentation shall identify material type, destination facility, and quantity.
4. Annual Waste Reports: Submit annual waste reports for multi-year projects through the end of each calendar year. Submit annual waste report by February 1 of the following year.
5. Final Submission: Submit a complete and final Waste Reporting Log, including all supporting documentation, prior to Substantial Completion.
6. Condition of Acceptance: Failure to submit accurate and complete Waste Reporting Logs may result in withholding of payment and shall delay determination of Substantial Completion.

1.5 QUALITY ASSURANCE

- A. Waste Management Coordinator: Designate an individual responsible for implementation, monitoring, and reporting of construction waste management activities.
1. The Waste Management Coordinator shall:
 - a. Implement the approved Construction Waste Management Plan.
 - b. Coordinate construction waste handling practices among subcontractors.
 - c. Maintain the Waste Reporting Log and supporting documentation.
 - d. Ensure compliance with applicable laws and regulations.
- B. Regulatory Requirements: Comply with all applicable local, state, and federal regulations governing transportation, recycling, salvage, and disposal of construction waste.
- C. Provide relevant sustainability documentation.

PART 2 - PRODUCTS <Not Used>

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. Implement the approved Construction Waste Management Plan throughout the duration of the Work.
- B. Provide containers, signage, training, handling, and transportation necessary to comply with the approved plan.
- C. Train subcontractors and workers in proper construction waste separation and handling procedures applicable to their work.
- D. Failure to comply with the approved Construction Waste Management Plan or reporting requirements shall be cause for corrective action and may result in withholding of payment.

3.2 SALVAGING CONSTRUCTION WASTE

- A. Salvage construction waste designated for reuse, recycling, or donation in accordance with the approved Construction Waste Management Plan.
- B. Handle salvaged construction waste to prevent damage, contamination, or loss.
- C. Store salvaged construction waste in designated areas protected from weather and construction traffic.

3.3 RECYCLING CONSTRUCTION WASTE

- A. Separate recyclable construction waste at the Project site where practical.
- B. Transport recyclable construction waste to licensed recycling facilities capable of accepting the materials.

- C. Do not contaminate recyclable construction waste with non-recyclable materials.

3.4 DISPOSAL OF CONSTRUCTION WASTE

- A. Dispose of construction waste not designated for salvage or recycling at licensed, permitted disposal facilities.
- B. Do not allow construction waste to accumulate on site except as required for orderly handling and removal.
- C. Burning or burying of construction waste on the Project site is prohibited.
- D. Transport construction waste in a manner that prevents spillage, dust, or contamination of adjacent areas.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

Latest Update: 08/06/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final Completion procedures.
 - 3. Preparation, organization, and submission of Construction Punch List.
 - 4. Closeout submittals
 - 5. Final inspections and certifications.
 - 6. Final cleaning
 - 7. Preparation for occupancy.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Schedule of Maintenance Material Items:
 - 1. Submit complete list of all maintenance material items required by other Sections.
 - a. Specific Maintenance Material Submittals will be submitted as required by each relevant specification section.
 - 2. University review will constitute confirmation of receipt of all maintenance material items.

1.3 INFORMATIONAL SUBMITTALS

- A. Initial Construction Punch List:
 - 1. Submitted prior to Substantial Completion.
- B. Completed Substantial Completion Outstanding Work List

1. Submitted at Final Completion

1.4 CLOSEOUT SUBMITTALS

- A. Include Closeout Submittals referenced in the following specification sections:
 1. SECTION 017823 - OPERATION AND MAINTENANCE DATA
 2. SECTION 017839 - PROJECT RECORD DOCUMENTS
- B. The University reserves the right to withhold acceptance of the Work and final certification until all required closeout submittals have been submitted, reviewed, and accepted.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Initial Construction Punch List: Prepare and submit a comprehensive list of items to be completed and corrected. Indicate the value of each item on the list.
- B. Prior to Substantial Completion:
 1. Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - a. Obtain and submit releases from authorities having jurisdiction, permitting University unrestricted use of the Work and access to services and utilities. Including:
 - 1) occupancy permits,
 - 2) operating certificates,
 - <Edit to add any known special permits or releases for the project>
 - 3) similar releases.
 - b. Closeout submittals specified elsewhere in the Project Specifications and General Contract Conditions
 - c. Initial Testing, Adjusting, and Balancing Reports.
 - d. Turnover of maintenance agreements or service contracts.
 - e. Turnover information related to University's occupancy, use, operation and maintenance, asset information, and security.
 2. Procedures: Complete the following a minimum of 10 days prior to requested inspection date for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - a. Advise University of pending insurance coverage changes.
 - b. Make final changeover of permanent locks and deliver keys to University.
 - c. Advise University's personnel of changeover in security provisions.

- d. Complete startup and testing of systems and equipment.
- e. Perform preventive maintenance on equipment used prior to Substantial Completion.
- f. Complete required demonstration and training.
- g. Advise University of changeover in utility services.
- h. Participate with University in conducting inspection and walkthrough with local emergency responders.
- i. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- j. Complete final cleaning.
- k. Touch up paint and repair and restoration of marred exposed finishes to eliminate visual defects.
- l. Coordinate with the University to conduct inspections and walkthroughs required for occupancy.

C. Inspection:

1. Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests.
2. On receipt of request, University, in coordination with the Architect, will either proceed with inspection or notify Contractor of unfulfilled requirements.
3. The University will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the University or Architect, that must be completed or corrected before certificate will be issued.
4. The University's determination of Substantial Completion shall be final and may require approval by the following.
 - a. State Fire Marshal
 - b. Third Party Elevator Inspector
 - c. State Elevator Inspector
 - d. University Project Manager

D. Reinspection:

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Substantial Completion Outstanding Work List
 - a. List generated from completed inspection will form the basis of requirements for Final Completion.

E. Final Cleaning

1. Complete final cleaning procedure prior to occupancy. Coordinate with University to schedule final cleaning.

1.6 FINAL COMPLETION PROCEDURES

A. Prior to Final Completion:

1. Before requesting final inspection for determining Final Completion, complete the following:
 - a. Contractor assertion that all items on Substantial Completion Outstanding Work List have been resolved.
 - b. Final Application for Payment, inclusive of all required documentation.
 - c. Consent of surety to final payment.
 - d. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - e. Sustainability documentation.
 - f. Pest-control final inspection report.
 - g. Final Completion photo documentation.
 - h. Properly executed warranties
 - i. Approved O&M Manuals
 - j. Final Testing, Adjusting, and Balancing Reports.
 - k. Full Commissioning Report with completed functional tests
2. Final Inspection:
 - a. Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests.
 - b. On receipt of request, University and Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.
 - c. After inspection, University and Architect will notify Contractor of unfulfilled requirements that must be completed or corrected before certificate will be issued.
3. Reinspection:
 - a. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
Reinspections required due to incomplete or deficient Work may be subject to reimbursement of additional costs incurred by the University.
4. Substantial Completion Outstanding Work List
 - a. Certified copy of Substantial Completion outstanding work list stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Architect and University.

B. Final Completion Certification

1. Project will not be certified until all closeout submittals, inspections, and corrective work have been completed to the satisfaction of the University.
2. University will issue Certificate of Final Completion.
3. Final payment authorization is contingent upon Final completion certification by the University.

1.7 CONSTRUCTION PUNCH LIST

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, by room or space number.
 - 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.

1.8 PROJECT WARRANTIES

- A. Submit properly executed warranties within 15 days of substantial completion.
- B. Submit written warranties for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit University's rights under warranty.
- C. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by University during construction period by separate agreement with Contractor.
- D. Organize warranty documents into an orderly sequence based on the Project Manual table of contents.
- E. Provide warranties and bonds in PDF format. Assemble complete warranty and bond information as part of the Operations and Maintenance Manual submittal.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Final cleaning is a prerequisite to inspections for Substantial Completion and Final Completion.
- B. General: Perform final cleaning. Conduct cleaning and waste-removal to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- C. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

Subparagraphs below are a sample list of final cleaning requirements. Revise to suit Project.

- a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
- b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- e. Remove snow and ice to provide safe access to building.
- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- h. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
- i. Vacuum and mop concrete.
- j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.

-
- k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - m. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - n. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean food-service equipment to a sanitary condition, ready and acceptable for its intended use.
 - s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - t. Leave the Project clean and ready for occupancy.
2. Verify cleaning procedures with University Environmental Services prior to work and comply with any requirements to avoid conflicts with University standard cleaning agents.
- D. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests. **<DELETE IF NOT APPLICABLE TO PARTICULAR PROJECT>**
- E. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction. **<DELETE IF NOT APPLICABLE TO PARTICULAR PROJECT>**
- F. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the University's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the University's property. Dispose of these materials as directed by the University.

3.2 CORRECTION OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

Initial Issue Date: 8/6/2026

(A/E shall edit specifications to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit operation and maintenance manuals as electronic files only. Upload manuals to the University's PMIS in accordance with Section 013000 "Submittal Procedures." Enable electronic reviewer comments on draft submittals. Submission of paper copies is not required.
- C. Draft Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. University, Architect and Commissioning Authority will comment on whether general scope, content, and format of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and

training. University, Architect, and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with review comments. Provide written responses in a separate file. Submit copy corrected manual within **15** days of receipt of all comments and prior to commencing demonstration and training.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by the manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on content. Refer to submittal specification numbers and names. Organize manual by Division and identify submittals and operation manuals by specification section number.
3. Refer to UMB O&M Manual Template for bookmark tree details.
4. Provide searchable, text-recognizable PDF files. Scanned image-only PDF files and external hyperlinks to manufacturer websites or cloud storage locations are not acceptable.

1.4 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual to contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manufacturer and Suppliers List
4. Warranties
5. Manual contents – Organized by Division
 - a. Civil
 - b. Structural
 - c. Architectural
 - d. Mechanical
 - e. Electrical
 - f. Site Work
6. Contractors Closeout Documents
 - a. Fire Protection Drawing Files

- b. Fire Alarm Drawing Files
- c. Communication Drawing Files
- d. Security System Drawing Files

B. Title Page:

- 1. Use the university standard O&M Cover Sheet
- 2. Include the following information:
 - a. Name and address of Project.
 - b. Name and address of University.
 - c. Date of submittal.
 - d. Owner name and address
 - e. Board of Public Works and Maryland General Assembly information
 - f. Name and contact information
 - 1) General Contractor/Construction Manager
 - 2) Architect
 - 3) Major consultants to the Architect that designed the systems contained in the manuals.
 - 4) Commissioning Authority.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual. Match order from project specifications.

- 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size..

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents.

F. Product Information: Include the following, as applicable:

- 1. Product name and model number.
- 2. Manufacturer's name.
- 3. Color, pattern, and texture.
- 4. Reordering information for specially manufactured products.

G. Maintenance Procedures: Include manufacturer's written recommendations and the following:

- 1. Inspection procedures.

2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- H. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017839 - PROJECT RECORD DOCUMENTS

Initial Issue Date: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. As-Built Drawings.
 - 2. As-Built specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
 - 5. Asset management information

1.3 CLOSEOUT SUBMITTALS

- A. As-Built Drawings: Contractor shall submit redline set of As-Built Drawings as annotated PDF electronic files, reflecting actual conditions of the Work as constructed.
 - 1. Maintain electronic record markups continuously during construction. Post changes as they occur; do not wait until end of Project.
 - 2. Record information shall include changes made by Change Orders, Construction Change Directives, field modifications, concealed conditions, rerouting of utilities, and actual equipment locations.
 - 3. As-Built Drawings shall be coordinated with construction photographs where applicable.
 - 4. As-Built Drawings shall be submitted through the University's PMIS.
- B. As-Built Specifications: Contractor shall submit annotated PDF electronic files of Project Specifications, including Addenda and Contract Modifications.
 - 1. Clearly indicate actual products installed, substitutions approved, and selections made.
 - 2. Reference related Change Orders and As-Built Drawings where applicable.

1.4 AS-BUILT DRAWINGS

- A. General: Maintain Project As-Built Drawings to document actual conditions of the Work as constructed.
 - 1. Record information continuously during construction. Do not defer recording until closeout.
 - 2. Record information shall be based on field observations, measurements, and verified conditions.
 - 3. Record information prior to concealment of Work.
- B. Content: As-Built Drawings shall include, but are not limited to, the following:
 - 1. Dimensional changes to Drawings.
 - 2. Revisions to details shown on Drawings.
 - 3. Locations and depths of underground utilities.
 - 4. Routing of piping, conduits, and ductwork.
 - 5. Electrical circuitry revisions.
 - 6. Actual equipment locations and identification.
 - 7. Field conditions and details not shown on original Drawings.
 - 8. Changes made by Change Orders or Construction Change Directives.
 - 9. Information shown schematically in the Contract Documents.
 - 10. Field records for variable and concealed conditions.
- C. Format: Submit As-Built Drawings as annotated PDF electronic files.
 - 1. Organize files to correspond to the original Contract Drawing sheet numbering.

1.5 AS-BUILT SPECIFICATIONS

- 1. Preparation: Maintain one electronic copy of As-Built Specifications, including Addenda and Contract Modifications, marked to indicate actual construction conditions.
 - 2. Clearly identify products installed where different from those specified.
 - 3. Indicate substitutions and product options approved.
 - 4. Reference related Change Orders and As-Built Drawings where applicable.
- B. Format: Submit As-Built Specifications as annotated PDF electronic files.

1.6 MAINTENANCE OF AS-BUILT DOCUMENTS DURING CONSTRUCTION

- A. Maintain Project As-Built Documents in electronic format using the University's electronic project management system or an approved electronic system that is accessible by the owner.
 - 1. Maintain As-Built Documents in a complete, legible, and current condition throughout construction.

2. Provide access to Project As-Built Documents for the University and Architect during normal working hours through the electronic project management system.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017900 - DEMONSTRATION AND TRAINING

Initial Issue Date: 8/6/2026

(A/E shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Remove text underlines and highlights)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing University's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.
 - a. Coordinate with approved Operation and Maintenance Data submitted under Section 017823.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit an outline of the planned training and schedule and name of instructor
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.3 CLOSEOUT SUBMITTALS

<Remove if video of training is not required.>

- A. Demonstration and Training Video Recordings: Submit recordings within seven days of each training module.
 - 1. Identification: Provide a summary list of every video with the following information:
 - a. Name of Project.
 - b. Name of University
 - c. Name of Architect.
 - d. Name of Construction Manager/General Contractor.
 - e. Date of video recording.

2. Video file name shall include the project number, a short description of the content, and the date:
 - a. Example: 20-399_AHU_2026-10-30
3. Training Manuals are included in the Operations and Maintenance Manuals.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.

1.5 SCHEDULE COORDINATION

- A. Coordinate instruction schedule with University's operations and personnel availability. Minimize disruption of University operations.
 1. Schedule training with at least seven days' advance notice.
 2. Provide notification of dates, times, length of instruction time, and course content.

1.6 INSTRUCTION PROGRAM

- A. University Operations and Maintenance Staff may review Training Program and determine which modules are needed during official training.
- B. Conduct training on-site using the actual equipment in-place. Conduct training using final operation and maintenance manuals.
- C. Provide sufficient training to enable University personnel to operate systems without reliance on Contractor support.
- D. Attendance Record: Provide sign-in sheet for each training module.
- E. Training Modules: For each module, include instruction for the following as applicable to the system, equipment, or component:
 1. Basis of System Design, Operational Requirements, and Criteria
 2. Documentation:
 - a. Operations and Maintenance manuals.
 - b. Project Contractor redline documents.
 - c. Warranties and bonds.
 - d. Maintenance service agreements and similar continuing commitments.

3. Operations:
 - a. Startup procedures.
 - b. Routine and normal operation
 - c. Control sequences.
 - d. Safety procedures.
 - e. Emergency operation procedures.
 - f. Equipment failure.
 - g. Any additional special operating instructions and procedures.
 - h. Troubleshooting
4. Maintenance and Cleaning

1.7 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

<Delete if video of training is not required.>

- A. General: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids.
 1. At beginning of each training module, record training topic and equipment covered.
- B. Video Files:
 1. Submit video recordings as directed by the University PM.
 2. File Names: Follow University file name conventions. Include Project Number in all file names.
- C. Recording:
 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. If training session exceeds 15 minutes edit video into multiple segments.
- D. Transcript: Include a transcript of the narration.
- E. Preproduced Video Recordings: Provide manufacturer videos if used as part of the training.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 019113 – GENERAL COMMISSIONING REQUIREMENTS

Latest Update: 5.8.2017 See Underlined Text for Edits.

(Architect shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Delete paragraphs not applicable to the project, and note some pertinent editor's comments in this section by the University. Also turn off "Underlines".)

PART I – 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.

1.2 SUMMARY

- A. Section includes the administrative requirements related to commissioning and includes the following:
 - 1. Definitions
 - 2. Coordination
 - 3. Quality control
 - 4. Submittals
 - 5. Design review and documentation
 - 6. Test equipment
 - 7. Commissioning process
 - 8. Commissioning scope meetings
 - 9. Commissioning plans
 - 10. Submittal review
 - 11. Commissioning controls coordination meeting
 - 12. Startup/Pre functional check lists
 - 13. Functional performance testing
 - 14. Issue log
 - 15. Operations and maintenance training
 - 16. Final commissioning report
 - 17. Deferred seasonal testing
 - 18. Team responsibilities
- B. The Owner, Architect/Engineer, and Commissioning Agent are not responsible for construction means, methods, job safety, or management function related to commissioning on the job site.
 - 1. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

2. The mention of a subcontractor is not meant to usurp the Contractor's responsibility to assign the work.

C. Related Sections:

1. 014000 Quality Requirements
2. 017700 Closeout Procedures
3. 017900 Demonstration and Training
4. 210000 General Requirements Fire Protection Systems
5. 210800 Commissioning Fire Protection Systems
6. 220000 General Requirements Plumbing Systems
7. 220800 Commissioning Plumbing Systems
8. 230000 General Requirements HVAC Systems
9. 230800 Commissioning HVAC Systems
10. 260000 General Requirements Electrical Systems
11. 260800 Commissioning Electrical System

1.3 DEFINITIONS

- A. Basis of Design (BOD): The Basis of Design document is a specific Commissioning document that describes the systems, components, conditions and methods chosen by the design engineer to meet the requirements of the project. Some reiteration of the Owner's Project Requirements may be included.
- B. Commissioning (Cx): Commissioning is a comprehensive and systematic process to verify that the building systems perform as designed to meet the Owner's requirements. Commissioning during the construction, acceptance and warranty phases is intended to achieve the following specific objectives:
 1. Verify and document that the equipment is installed and started per manufacturer's recommendations, industry accepted minimum standards, and the Contract Documents.
 2. Verify and document that the equipment and systems receive complete operational checkout by installing contractors.
 3. Verify and document equipment and system performance.
 4. Verify the completeness of the Operations and Maintenance materials.
 5. Ensure that the Owner's operating personnel are adequately trained on the operation and maintenance of building equipment.
 6. The commissioning process does not take away from or reduce the responsibility of the systems designers or installing contractors to provide a finished and fully functioning product.

- C. Commissioning Agent (CxA): The commissioning agent develops the functional test procedures in a sequential written form, coordinates, oversees, and documents the actual testing, which is usually performed by the installing contractor or vendor. Functional Performance Tests are performed after pre-functional checklists and startup is complete.
- D. Commissioning Plan: The commissioning plan is an overall plan that provides the structure, schedule, and coordination planning for the commissioning process.
- E. Deficiency: A deficiency is a condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents, does not perform properly, or is not complying with the Owner's Project Requirements.
- F. Owner's Project Requirements (OPR): The OPR is a specific Commissioning document that is updated throughout the project that provides the explanation of the ideas, concepts, and criteria that are considered to be very important to the Owner. It is initially the outcome of the programming and conceptual design process.
- G. Functional Performance Test (FPT): The FPT is a test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g. the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failure, unoccupied, varying outside air temperatures, fire alarm power failure, and any other operational sequence included in the system design. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The CxA develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. Functional Performance Tests are performed after prefunctional checklists and startup is complete.
- H. Prefunctional Checklist: The pre-functional check list is a list of items to inspect and elementary component test to conduct to verify proper installation of equipment, provided by the CxA to the contractor. Prefunctional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g. belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated). However, some prefunctional checklist items entail system testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The word "prefunctional" refers to before functional testing. Prefunctional checklists augment and are combined with the manufacturer's start-up checklist.

- I. Warranty Period: The warranty period is for the entire project, including equipment components. Warranty begins at Substantial Completion and extends for two years, unless specifically noted otherwise in the Contract Documents and accepted submittals.
- J. Abbreviations: The following are common abbreviations used in the Commissioning Specification:
 - 1. A/E - Architect and Engineers
 - 2. CxA - Commissioning Agent
 - 3. CC - Controls Contractor
 - 4. Cx Plan - Commissioning Plan document
 - 5. FPT - Functional Performance Test
 - 6. CM/GC - Construction Manager/General Contractor <Edit for Project>
 - 7. MEP – Mechanical, Electrical, Plumbing
 - 8. PM - Project Manager (University)
 - 9. Subs - Subcontractors to the General Contractor
 - 10. TAB - Test and Balance Contractor

1.4 COORDINATION

- A. Perform commissioning services to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
- B. Commissioning Agent (CxA) shall provide overall coordination and management of the commissioning program as specified herein.
- C. Commissioning Team: The commissioning process will require the cooperation of the Contractor, subcontractors, vendors, Architect/Engineer, Commissioning Agent, and Owner. The commissioning team shall be comprised of the following. Team member responsibilities are listed in Part 3 of this section.
 - 1. Construction Manager:
 - a. Project Manager
 - b. Test Engineer
 - c. Subcontractors: As appropriate to product or system being commissioned
 - 1) Specialty Contractor Representatives
 - 2) Controls Representative
 - 2. Commissioning Agent:
 - a. Project Manager
 - b. Project Technicians
 - 3. Owner Representative(s)

4. Architect/Engineer:
 - a. Architect
 - b. MEP Engineers
 - c. Specialty Consultant(s)

D. Progress Meetings: Attend construction job-site meetings, as necessary, to monitor construction and commissioning progress. Coordinate with contractor to address coordination, deficiency resolution, and planning issues.

1. Plan and coordinate additional meetings as needed based on work progress.

E. Site Observations: Perform site visits as necessary to observe component and system installations.

F. Functional Testing Coordination:

1. Equipment shall not be “temporarily” started for commissioning.
2. Functional performance testing shall not begin until pre-functional check, start-up, and TAB are completed for a given system.
3. The controls system and equipment controls shall not be functionally tested until all points have been calibrated and pre-functional checklists are complete.

1.5 QUALITY CONTROL

- A. Engage commissioning service personnel that specialize in the types of inspections and tests to be performed.
- B. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems of the systems to be commissioned.

1.6 SUBMITTALS

- A. Basis of Design and Owner’s Project Requirements:
 1. CxA shall review BOD and OPR updates made necessary during the work to reflect the progress on the components and systems.
- B. Cx Meeting Minutes:
 1. CxA shall prepare meeting minutes and provide to Owner’s PM for distribution.
- C. Commissioning Plan:

1. Update as necessary during the work to reflect the progress on the components and systems.

D. Functional Performance Test Forms:

1. Submit no later than thirty (30) calendar days prior to testing, or two (2) weeks after acceptance of ATC submittal.

E. Issues Log: Issue logs document items of non-compliance in materials, installation or operation. Document the results from start-up/pre-functional checklists, functional performance testing, and on-site observations. Include details of the components or systems found to be non-compliant with the drawings, specifications, and approved submittals. Team member responsibilities related to issues identified during commissioning are covered in Part 3 of this specification.

1. Update as necessary during the work to reflect the progress on the components and systems.

F. Final Commissioning Report: Compile a final commissioning report summarizing all the tasks, findings, conclusions, and recommendations of the commissioning process. Indicate the actual performance of the building systems in reference to the OPR and contract documents. Include completed pre-functional inspection checklists, functional performance testing records, Issues Log, and a summary of commissioning activities.

G. O&M Submittals:

1. Training Verification:
 - a. Dates, Start and Finish Times, and Locations
 - b. Outline of the Training Agenda
 - c. Names and qualifications of presenters
 - d. Completed sign-in sheet from training sessions

1.7 DESIGN REVIEW AND DOCUMENTATION

A. Document Basis of Design and Project Requirements as they relate to project functional performance and environmentally responsive characteristics, including:

1. Functionality
2. Energy Performance
3. Water Efficiency
4. Maintainability
5. System Cost
6. Indoor Environmental Quality
7. Local Environmental Impacts

- B. Review design documents to verify that each commissioned system meets the Project Requirements.
- C. Review construction documents to verify that commissioning is adequately specified, that each commissioned system can be commissioned and is likely to meet the Project Requirements.

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

- A. The contractor will make available standard testing equipment required to perform startup, initial checkout and functional performance testing as well as any special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents.
- B. Data Logging equipment and software required to test equipment shall be provided by the CxA, but shall not become property of the Owner.
- C. Instrumentation shall meet the following standards:
 - 1. Be of sufficient quality and accuracy to test and measure system performance within the tolerances required to determine adequate performance.
 - 2. Be calibrated on the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument being used.
 - 3. Be maintained and in good repair and operational condition throughout the duration of use on this project.
- D. Test Equipment Calibration Requirements: Contractors shall comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired after being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

PART 3 – EXECUTION

3.1 COMMISSIONING PROCESS

- A. The following activities outline the commissioning tasks and the general order in which they occur. The CxA shall coordinate all activities.
 - 1. Design Review and Documentation:
 - a. Basis of Design and Owner's Project Requirements Review
 - b. Design Document Review
 - c. Controls Coordination Review Meeting
 - d. Construction Document Review

2. Commissioning Scoping Meetings
3. Commissioning Plan
4. Submittal Review:
 - a. General systems to be Commissioned
 - b. Controls Submittal Review
5. Commissioning Controls Coordination Meeting
6. Start-Up / Pre-functional Checklists
7. Functional Performance Testing
8. Issues Log
9. Operations and Maintenance Training
10. Final Commissioning Report
11. Deferred and Seasonal Testing

3.2 DESIGN REVIEW AND DOCUMENTATION

- A. Basis of Design and Owner's Project Requirements Review: Collect BOD and OPR documents from Owner and MEP Engineer. Review documents as they relate to functionality, energy performance, water efficiency, maintainability, system costs, indoor environmental quality, local environmental impacts, and any requirements specifically specified by the Owner in the OPR.
- B. Design Document Review: Review design documents at two phases of design to verify that each commissioned system meets the Owner's requirements with special attention on integrated systems, building automation controls, and functional performance. Design review comments shall be submitted in writing to A/E and Owner. A/E will respond in writing to all comments prior to next document submission.
- C. Controls Coordination Review Meeting: Comply with the following: **<Edit for Project>**
 1. Schedule, coordinate, and facilitate a **full day** meeting during design phase between 50% CD and 95% CD submissions, or at a point in design where the building automation control design is at least 50% complete and includes system diagrams and sequences of operation.
 2. Attendees shall include the design engineer, **CM representative**, University O&M representative, **controls contractor, mechanical design assist contractor**, and CxA.
 3. The team shall review all sequences of operation to determine whether they are complete, accurate, and meet with university standards and operating practices. Special attention shall be paid to interactions between new systems and equipment and existing building and campus controls systems.
- D. Construction Document Review: Review final construction documents to confirm that all design review comments have been resolved.

3.3 COMMISSIONING SCOPE MEETINGS

- A. Commissioning Scope Meeting – Design Phase:

1. Schedule, coordinate, and facilitate a scope meeting during the design phase prior to the first design review.
2. Cx Team members who have been hired during the design phase shall be in attendance.
3. Review the Cx process with special attention on the design phase requirements.

B. Commissioning Scope Meeting – Construction Phase:

1. Schedule, coordinate, and facilitate a scoping meeting at the start of construction after the subcontractors have been selected.
2. All Cx Team members shall be in attendance.
3. Review the Cx process with special attention on the construction phase requirements.

3.4 COMMISSIONING PLAN

- A. Develop a Commissioning (Cx) Plan to identify how commissioning activities will be integrated into general construction and trade activities. The Cx Plan shall identify how commissioning responsibilities are distributed. The intent of this plan is to raise questions and issues and resolve them with input from the entire Cx Team early in construction.
1. Identify who will be responsible for producing the various procedures, reports, and forms.
 2. Determine what Cx activities will be scheduled and how they are incorporated into the project schedule.
 3. Describe the testing and acceptance procedures.

3.5 SUBMITTAL REVIEW

A. Identify Submittals for Commissioning Review:

1. At start of Construction Phase, CM shall provide a complete submittal register to the CxA. The CxA shall identify which submittal packages should be reviewed for coordination with the commissioning scope. The University shall confirm and/or amend the list and return it to the CM. During submittal phase, submittals identified as Cx submittals shall be sent to the CxA and the Engineer of Record concurrently for review.

B. General Systems to be Commissioned:

1. Concurrently with the Engineer of Record, review the equipment and system submittals for the equipment to be commissioned to verify that the submitted equipment meets the requirements of the contract documents and the OPR. Focus on integration of equipment within the building systems.

C. Controls Submittal Review

1. Concurrently with the Engineer of Record, review the Automatic Temperature Control submittal to verify that the submitted design meets the requirements of the contract documents, the OPR, and the design intent for the operation of the building systems. After submittal review is complete, schedule the Commissioning Controls Coordination Meeting prior to manufacturer's resubmittal of ATC package. Only if the submittal is accepted with no comments noted by the A/E team, the Commissioning Controls Coordination Meeting may be skipped.

3.6 COMMISSIONING CONTROLS COORDINATION MEETING

A. Meeting Attendees:

1. CxA
 2. Controls Contractor
 3. Engineer of Record
 4. Owner's Representatives
 5. CM/GC
 6. Architect
- B. After the first controls submittal review is complete, schedule, coordinate and facilitate the Commissioning Controls Coordination Meeting.
- C. Review all submittal review comments with the group and, as a group, determine the required resolution for each comment. Controls resubmittal shall be submitted within two (2) weeks of this meeting.

3.7 START-UP / PRE-FUNCTIONAL CHECKLISTS

- A. Start-up/Pre-Functional Checklists: Coordinate start-up plans and documentation formats, including providing contractor with pre-functional checklists to be completed during the start-up process.
1. Manufacturer's start-up checklists and other technical documentation guidelines may be used as the basis for pre-functional checklists. CxA will coordinate with the Contractor to obtain manufacturer data as needed.
- B. Start-up/Pre-Functional Checklists are used to verify that the systems are complete and operational before functional testing is scheduled.

3.8 FUNCTIONAL PERFORMANCE TESTING

- A. Functional Performance Tests (FPT): Test procedures shall fully describe system configuration and steps required for each test; appropriately documented so that the test can be repeated with virtually identical results.

1. Test Methods: Functional performance testing and verification may be achieved using a combination of the following methods to test the complete sequence of operation. The CxA shall determine which method, or combination, is most appropriate:
 - a. Direct manipulation of system inputs (i.e. applying heat or cold to sensors).
 - b. Manipulation of system inputs with the building automation software (i.e. software override of sensor inputs)
 - c. Direct observation of equipment readouts, gauges, and actuators.
 - d. Trend logs of system inputs and outputs using the building automation system
 - e. Short-term monitoring of system inputs and outputs using stand alone data loggers.
 2. Setup: Setup each test procedure to be performed under conditions that simulate normal operating conditions as closely as possible. Where equipment requires integral safety devices to stop/prevent equipment operation unless minimum safety standards or conditions are met, functional performance test procedures shall demonstrate the actual performance of safety shutoffs in a real or closely-simulated condition of failure.
 3. Sampling: Multiple identical pieces of non-life-safety or non-critical equipment may be functionally tested using a sampling strategy. The sampling strategy shall be developed by the CxA. If, after three attempts at testing the specified sample percentage, failures are still present, then all remaining units shall be tested at the contractor's expense. Sampling may only be used as agreed upon in the Cx contract.
 4. Trending: Identify conditions where trend data from the building automation system or data loggers can be used to verify sequence of operation performance. Include trend log requirements in FPT documentation.
- B. Develop FPT procedures for equipment and systems identify specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Coordinate test procedures with the contractor for feasibility, safety, equipment, and warranty protection. Functional performance test forms shall include the following information at a minimum:
1. System and equipment or component name(s)
 2. Equipment location and ID number
 3. Date
 4. Project name
 5. Participants
 6. Test Set-up instructions including special requirements and alarm limits.
 7. Step-by-step test procedure

8. Acceptance criteria
9. Comments

C. Coordinate, observe, and record the results of the FPT's:

1. Coordinate retesting as necessary until correct performance is verified.
2. Verify the intended operation of individual components and system interactions under all design conditions and modes of operation.
3. Identify deficiencies during testing and include on FPT forms and the Issues Log
4. Confirm set-up of trend logs and collect data after the sample time period.

3.9 ISSUES LOG

- A. Issues are items of non-compliance in materials, installation, or operation observed by the CxA.
- B. The CxA shall notify responsible parties upon observation of deficiencies or issues of non-compliance. CxA shall recommend corrective actions as appropriate. Issues that are not immediately resolved shall be placed on the Issues Log.
- C. The CxA shall update the Issues Log and submit it to the PM for distribution to all members of the Cx Team when changes are made.
- D. Those identified as "Responsible" for a specific issue shall respond within three (3) days of receiving an updated Issues Log with the planned resolution.
 1. "Responsible" indicates the party who is responsible for responding to the open issue, it does not imply responsibility for creating the issue. For example, if the issue relates to a temperature set-point, the Owner may be listed as the responsible party for providing the desired value.
 2. Any member of the design and construction team may be identified to respond to Cx Issues. Team members are responsible for responding to design and construction questions raised during commissioning work.

3.10 OPERATIONS AND MAINTENANCE TRAINING

- A. Reference 017900 "DEMONSTRATION AND TRAINING"
- B. Verify and document training:
 1. Training Verification:
 - a. Dates, Start and Finish Times, and Locations
 - b. Outline of the Training Agenda
 - c. Names and qualifications of presenters

- d. Completed sign-in sheet from training sessions

C. Review O&M materials.

3.11 FINAL COMMISSIONING REPORT

- A. Final Commissioning Report: Compile final commissioning report. Summarize all the tasks, findings, conclusions and recommendations from the Commissioning process. Include a “Lessons Learned” section.

3.12 DEFERRED AND SEASONAL TESTING

- A. If a test cannot be completed due to building conditions, occupancy, weather, or seasonal conditions, the functional testing may be delayed upon the recommendation of the CxA and the approval of the Owner.

3.13 TEAM RESPONSIBILITIES

A. Owner’s Responsibilities:

1. Provide the OPR documentation to the CxA and Contractors for use in developing the Cx Plan, testing plans, and checklists.
2. Provide the Basis of Design documents, prepared by the architect and approved by the Owner, for use in developing the Commissioning Plan; testing plans and checklists.
3. Assign operation and maintenance personnel and schedule them to participate in Commissioning Team activities including, but not limited to, the following:
 - a. Commissioning meetings.
 - b. Construction phase coordination meetings.
 - c. Piping and ductwork testing and flushing verification meetings.
 - d. Procedures meeting for testing, adjusting and balancing.
 - e. Testing and demonstration of systems, subsystems and equipment.
 - f. Training in operation and maintenance of systems, subsystems and equipment.
 - g. Final review and acceptance meetings.
 - h. Provide utility services required for the commissioning process.
 - i. Review and approve the commissioning plan.
 - j. Coordinate any seasonal or deferred testing.
 - k. Ensure that any seasonal, deferred testing and/or deficiency issues are addressed.

B. Architect / Engineer’s Responsibilities:

1. Attend the Commissioning Scoping Meetings, Controls Coordination Meetings, and selected team meetings.
2. Perform submittal review, construction observation, as-built drawing preparation, and other items as contracted.
3. Provide the Basis of Design Document. The design engineers shall assist in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
4. Participate in the resolution of system deficiencies and issues identified during the commissioning, according to the contract documents.
5. Insure that the CxA's submittal comments are incorporated into the Design Professional's submittal comments prior to sending to CM for distribution.
6. Participate in resolution of design non-conformance and design deficiencies identified during the warranty-period commissioning process.

C. Construction Manager, Contractor, and Subcontractor Responsibilities:

1. 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 brief overview:
 - a. Facilitate the coordination of commissioning and incorporate commissioning activities into the overall project.
 - b. Provide copies of all applicable submittals as required in the specifications including all changes.
 - c. Provide detailed startup procedures.
 - d. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, perform corrective actions.
 - e. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
 - f. Attend commissioning team meetings held on a scheduled basis.
 - g. Make available a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.
 - h. Integrate and coordinate commissioning process activities with construction schedule.
 - i. Review construction checklists provided by the CxA.
 - j. Review commissioning process test procedures provided by the CxA.
 - k. Complete commissioning process test procedures.

-
- l. Submit training plan for approval, coordinate training and provide qualified instructors for training of Owner personnel.
 - m. Assist the CxA as necessary in the seasonal testing, deferred testing and deficiency resolution.
 - n. Ensure that subcontractors correct deficiencies and make necessary adjustments to submittals, O&M manuals and red-lined drawings for applicable issues identified during testing.
 - o. Provide as-built controls drawings and sequences of operation for all equipment.
 - p. Provide a written list of all user adjustable set-points and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications.
 2. Equipment Supplier Responsibilities:
 - a. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
 - b. Assist in equipment testing per agreements with subcontractors.
 - c. Provide information requested by the CxA regarding equipment sequence of operation and testing procedures.
 3. Commissioning Agent Responsibilities:
 - a. Roles and Responsibilities:
 - 1) The CxA is not responsible for the design concept, the design criteria, compliance with codes, design or general construction scheduling, cost estimating or construction management.
 - 2) The CxA may assist with problem solving and non-conformance items or deficiencies, but the CxA is not the Engineer of Record, and the commissioning process does not preclude the Engineer of Record of responsibilities for system evaluations, adequacy of systems to meet the OPR, capacities of systems, quality control checks, or any of the other elements and recommended final acceptance of systems to the Owner.
 - 3) The primary role of the CxA is to coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultants with all necessary parties, frequently updated timelines and schedules and technical expertise.
 - b. Commissioning Plan:

- 1) The CxA shall develop a Commissioning Plan at the start of the project.
 - 2) At the end of the Project, the CxA shall provide the Owner with the Final Commissioning Plan for the Owner's use.
- c. Document Review:
- 1) Review the Owner's Project Requirements and Basis of Design developed by the design professionals.
 - 2) Perform two (2) focused reviews of the drawings and specification during design phase. ~~<Edit for Project>~~
 - 3) Develop full commissioning specifications for all systems and equipment to be commissioned. The commissioning specifications will be subject to approval of the design team and included in the final construction specifications.
 - 4) Review submittals applicable to systems being commissioned for compliance for commissioning needs, concurrent with the AE's reviews.
- d. Cx Team Meetings:
- 1) Lead Cx Meetings during design and construction.
- e. Coordination and Scheduling:
- 1) Coordinate and direct commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications, and consultations with all necessary parties.
 - 2) Coordinate commissioning work with the CM to ensure that commissioning activities are being scheduled into the master project schedule.
- f. Commissioning Progress:
- 1) Perform site visits, as necessary, to observe component and system installations.
 - 2) Attend selected planning and jobsite meetings to obtain information on construction progress.
 - 3) Review construction meeting minutes for revisions/substitutions relating to the commissioning process.
- g. Pre-Functional Checks:
- 1) Verify proper installation of components, equipment, systems and assemblies.

-
- h. Equipment and System Startup and Verification:
 - 1) Review system startup reports and conduct selected site observation.
 - 2) Perform TAB verification per contract requirements, and review the TAB report prior to functional testing.
 - 3) Functional Performance Testing
 - 4) With assistance from the Contractor, write Functional Performance Test procedures for all components, equipment or systems to be commissioned.
 - 5) With the assistance of the Contractors, coordinate Functional Performance Testing. Witness and approve Functional Performance Testing performed by the Contractors.
 - i. With the assistance of the Contractors, coordinate retesting as necessary until satisfactory performance is achieved.
 - j. Witness seasonal or deferred Functional Performance Testing as necessary.
4. Issue/Deficiency Logs:
- a. Prepare a formal, ongoing, online record of deficiencies, problems and concerns – and their resolution – raised by members of the Commissioning Team during the Commissioning Process.
 - b. Issues will be recorded in the Issues Log. The AE, CM/GC and Contractors will resolve all issues to the satisfaction of the Owner. Issues will be added by the CxA. Team members are required to respond to issues pertaining to their work. Team members are required to respond to issues added to the list within five (5) working days of issue of an update to the Issues Log.
 - c. When issues are resolved, they will be closed on the Issues Log by the CxA.
5. Operation and Maintenance Data:
- a. The CxA shall review of the documentation submitted by the Contractor as required by the Specifications for completeness and accuracy. This commissioning review supplements, but does not replace, the Architect/Engineer's review.
 - b. Review equipment warranties to ensure that the Owner's responsibilities are clearly defined.
6. Training:

- a. The CM/GC and Contractors will provide all documentation and qualified training personnel for training.
 - b. The CxA will verify through the Contractor's plan and schedule, training agendas, and attendance documentation that proper training procedures were followed on all commissioned systems.
 - c. See specifications for training requirements.
7. Commissioning Final Report:
- a. The CxA shall provide a final report following the completion of all Functional Performance Testing.

END OF SECTION 019100

SECTION 019115 – Building Enclosure Commissioning Requirements

Latest Update: 1.26.2026.

(Building Enclosure Commissioning Provider shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating testing indicated in the specifications and adding any additional specifications that may be required by the project. Delete paragraphs not applicable to the project, and note some pertinent editor's comments in this section by the University. Turn off underlines)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the administrative requirements related to commissioning and includes the following:

1. Definitions
2. Related documents
3. Coordination
4. Quality control
5. Responsibilities
6. Applicable standards
7. Test equipment
8. Meetings
9. Reporting
10. Pre-functional checklists
11. In-situ testing
12. Documentation, non-conformance and approval of tests
13. Building enclosure mock-up (in-situ)
14. Repair and Protection
15. Training
16. Final BECx report

- B. This section shall be used in conjunction with section 019113 – General Commissioning Requirements.

1. Building Enclosure Commissioning (BECx) is an integral component of the overall Building Commissioning process. The final Building Enclosure Commissioning (BECx) Report shall be incorporated into the Final Commissioning Report as defined in Section 019113.

- C. Related Sections:

Edit for project

- | | | |
|----|--------|-------------------------|
| 1. | 033000 | Cast-In-Place Concrete |
| 2. | 042000 | Unit Masonry |
| 3. | 044200 | Exterior Stone Cladding |

4.	061500	Exterior Architectural Woodwork
5.	070152	Operation and Maintenance of Thermal and Moisture Protection
6.	070543	Cladding Support System
7.	071326	Sheet Waterproofing
8.	071413	Hot Fluid Applied Rubberized Asphalt Waterproofing
9.	071616	Crystalline Waterproofing
10.	071800	Traffic Coating
11.	071900	Water Repellents
12.	072100	Thermal Insulation
13.	072726	Fluid-Applied Membrane Air Barrier
14.	074213	Metal Composite Material Wall Panels
15.	074229	Terra-Cotta Wall Panels
16.	075200	Modified Bituminous Membrane Roofing
17.	076200	Sheet Metal Flashing and Trim
18.	077129	Manufactured Roof Expansion Joint
19.	077273	Vegetated Roof System
20.	079100	Preformed Joint Seals
21.	079200	Joint Sealants
22.	079513	Exterior Expansion Joint Cover Assemblies
23.	084126	All-Glass Entrances
24.	084413	Glazed Aluminum Curtain Walls
25.	084426	Structural Glass Facades
26.	088000	Glazing
27.	089119	Fixed Louvers
28.	099600	High-Performance Coatings
29.	099672	Fluid-Applied Insulation Coatings

1.2 DEFINITIONS

- A. Air Barrier Envelope: The continuous boundary separating indoor and outdoor air. It consists of integrated assemblies, components, and accessories designed to prevent airflow across the environmental separator, encompassing the top, bottom, and all sides of the structure.
- B. Air Leakage Rate: The volume of air infiltration or exfiltration through the building envelope over time. This is measured as the airflow rate per unit of surface area at a specified differential pressure.
- C. Basis of Design (BOD): A formal document developed by the design team outlining the technical concepts, assumptions, calculations, and product selections required to meet the Owner's Project Requirements (OPR).
- D. Bias Pressure: This is the natural differential pressure between a sealed envelope and the outdoors when not artificially pressurized. It includes fixed static offsets (e.g., stack effect or HVAC) and fluctuating pressures (e.g., wind or elevator movement); multiple readings are typically averaged for accuracy.

- E. Blower Door: A diagnostic apparatus used to pressurize or depressurize a building to quantify envelope air leakage. It consists of a calibrated fan mounted in an exterior door frame using an airtight fabric or panel system to measure airflow.
- F. Building Enclosure (or envelope): The collective materials and systems that serve as an environmental separator between the interior and exterior, or between interior zones with different environmental requirements. The terms "enclosure" and "envelope" are used interchangeably.
- G. Building Enclosure Commissioning (BECx): Technical service provided on behalf of UMB to provide a quality-focused process for enhancing the performance of the building enclosure by validating the design phase and verifying during the construction phase that the performance of the building enclosure materials, components, assemblies, and systems are designed and installed to meet the Owner's Project Requirements (OPR).
- H. Building Enclosure Commissioning Provider (BECxP): An entity that functions as part of the overall commissioning team and is responsible for validating the design phase and verifying during the construction phase that the performance of the building enclosure materials, components, assemblies, and systems are designed and installed to meet the Owner's Project Requirements (OPR).
- I. Construction Phase: The period of a project following the award of construction contract to project completion.
- J. Design Phase: The period of the project delivery process when a design supporting the Owner's Project Requirements is developed and translated into contract documents.
- K. Deficiency: A condition in the installation or function of a component, or assembly that is not in compliance with the contract documents, that is, does not perform properly or is not complying with the Owner's Project Requirements.
- L. Issues Log: This is a log that is maintained and updated by the BECxP that includes all deficiency items that relate to the BECx activities, including a summary description of each deficiency, including a photograph where appropriate. The log shall include the date each deficiency item was first documented, that appropriate party responsible for remedial action, the date corrective action was performed, and a brief summary of the remediation.
- M. Environmental separator: The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments. The term "environmental separator" is also known as the control layer.
- N. First Installation Mock Up: The first full production-quality installation of a specific enclosure assembly or system, constructed as part of the actual building, and designated as a formal quality-control and performance verification benchmark before repetitive work proceeds. It is a construction-phase control mechanism, not a design-phase test assembly.

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- O. Functional Performance Test (FPT): A systematic process to verify that controls and other elements of the building project are capable of and configured to operate or perform as required.
- P. In-situ Mock Up: A full-scale, field-constructed assembly of building enclosure components built on the actual project site, using the actual materials, trades, sequencing, and installation methods that will be used in the permanent construction. It is a performance verification tool, not merely a visual or aesthetic sample.
- Q. Laboratory Mock Up: A full-scale or large-scale enclosure assembly constructed in a controlled laboratory environment for the purpose of performance testing, system validation, and design verification prior to field construction.
- R. Owner's Project Requirements (OPR): A document that details the stakeholders' requirements for the project and expectations for how it will be used and operated.
- S. Pre-functional Checklist: A quality control document used to verify that enclosure materials and assemblies are correctly installed, set up, and ready for formal performance testing.
- T. Pressure Test: A generic term for a test in which the envelope is either pressurized or depressurized with respect to the outdoors.
- U. Negative Pressure Test (Depressurized Test): A test wherein air inside the envelope is drawn to the outdoors. This places the envelope at a lower (negative) pressure with respect to the outdoors.
- V. Positive Pressure Test (Pressurized Test): A test wherein outdoor air is pushed into the envelope. This air movement places the envelope at a higher (positive) pressure with respect to the outdoors.
- W. Abbreviations: The following are common abbreviations used in the Building Enclosure Commissioning Specification:
1. A/E - Architect and Engineers
 2. BECxP – Building Enclosure Commissioning Provider
 3. BECx Plan – Building Enclosure Commissioning Plan
 4. BOD – Basis of Design
 5. FPT - Functional Performance Test
 6. CM/GC - Construction Manager/General Contractor <Edit for Project>
 7. OPR – Owner's Project Requirements
 8. PM - Project Manager (University)
 9. Subs - Subcontractors to the General Contractor
 10. ABAA – Air Barrier Association of America
 11. ASTM – American Society for Testing and Materials

1.3 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. Individual building enclosure specification sections: Individual building enclosure technical sections stipulated requirements for material testing, and warranties for the material, product or assembly specified in this section.
- C. Building Enclosure Testing Work Plan:
 - 1. For each building enclosure test to be performed, submit the following not less than <XX> calendar days prior to commencement of testing, steps to be taken by the test technician to accomplish the required testing.
 - a. Memorandum of test procedure
 - 1) Proposed dates for conducting the tests.
 - 2) Submit detailed test procedures prior to the test. Provide a plan view showing proposed locations to install equipment.
 - b. Test equipment to be used.
 - c. Scaffolding, scissor lifts, power, electrical extension cords, duct tape, plastic sheeting and other contractor's support equipment required to perform all tests.

1.4 COORDINATION

- A. Refer to Section 019113 General Commissioning Requirements for requirements pertaining to coordination during the commissioning process. Coordinate with commissioning provider in accordance with the commissioning specifications and in accordance with the commissioning plan to schedule inspections as required to support the commissioning process.
- B. Commissioning Team:
 - 1. Building Enclosure Commissioning Provider:
 - a. Project Manager
 - b. Project Technicians
 - 2. Building Enclosure Specialist
 - a. Project Manager
 - b. Project Technicians
 - 3. Construction Manager (CM) / General Contractor (GC):
 - a. Project Manager
 - b. Enclosure Subcontractors
 - 4. Design team:
 - a. Architect/Engineer of Record
 - 1) Project Manager
 - 2) Project Architect / Engineer
 - 3) Design staff
 - 5. Owner Representative(s)

6. Operation and Maintenance team:
 - a. Facility Manager
 - b. Staff
- C. Management: BECxP directs and coordinates the commissioning activities to owner's representatives. All members work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
- D. Scheduling: BECxP will work with Construction Manager (CM) and/or General Contractor (GC) according to established protocols to schedule commissioning activities. The BECxP will provide sufficient notice to the CM/GC for scheduling commissioning activities. The CM/GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
 1. BECxP will provide BECx Plan that includes the schedule. As Construction progresses more detailed schedules are developed by the BECxP.
- E. Functional Testing Coordination:
 1. BECxP will provide test protocol development that includes testing methods, parameters, pass/fail criteria.
 2. BECxP will coordinate with the CM/GC and their building enclosure subcontractors to ensure testing is performed after assembly installation and after all materials have cured in accordance with the manufacturer's installation requirements. Test assemblies shall not be sealed, concealed, or covered by materials outside the testing scope.

1.5 QUALITY CONTROL

- A. Qualifications:
 1. BECxP qualifications:
 - a. The BECxP shall be an independent, third-party entity directly engaged by the owner.
 - b. Professional certification: BECxP shall obtain current certification as a Building Commissioning Process Provider (BECxP) or Accredited Commissioning Authority + Building Enclosure (CxA+BE) as awarded by the University of Wisconsin-Madison, or approved equivalent certification such as the CBECxP as awarded by IIBEC.
 - c. Experience: A minimum of five (5) years of demonstrated experience in building science, enclosure design, and field performance testing.
 2. Field Testing Personnel qualifications: Testing technicians performing field testing shall hold relevant certifications for their specific tasks, such as ABAA (Air Barrier Association of America) Certified Air Barrier Specialist for air barrier inspections.
 3. Laboratory Testing Agency qualifications: The laboratory must hold active accreditations from recognized bodies to prove they maintain a rigorous quality

- management system, such as ISO/IEC 17025, ASTM E329, FGIA (Fenestration and Glazing Industry Alliance) Laboratory Accreditation.
4. Thermography Personnel Qualifications: Personnel Performing thermographic investigations shall be certified in accordance with ASNT SNT-TC-1A or ISO 18436-7, minimum Level 1 certification for data acquisition and Level II for interpretation and reporting.
 5. Building Enclosure Specialist Qualifications: The Building Enclosure Specialist shall have a minimum of five (5) years documented experience in the design, inspection, testing, and evaluation of building enclosure systems similar in scope and complexity to the Project.

1.6 SUBMITTALS

- A. Basis of Design (BOD): Refer to Section 019113 General Commissioning Requirements. BECxP shall review BOD and verify for Owner's Project Requirements (OPR) compliance.
- B. Owner's Project Requirements (OPR) : The BECxP shall assist the Owner in initiating, developing, and documenting the OPR. The BECxP shall gather input from the Owner, design team, and facility staff to define specific building enclosure performance criteria, including energy efficiency, durability, air and water leakage performance, constructability, and maintenance expectations. The BECxP shall continuously update and refine the OPR throughout the project lifecycle as changes occur, ensuring that design and construction remain aligned with the Owner's objectives.
- C. Building Enclosure Commissioning Plan (BECx Plan): The BECxP shall develop the initial BECx Plan during the pre-design phase to define the project's commissioning scope and framework. The BECx Plan shall establish procedures to verify that the building enclosure complies with the Owner's Project Requirements (OPR) and performance objectives. The plan shall include detailed scheduling and phasing coordination, communication and reporting protocols, documentation requirements, and clearly defined roles and responsibilities for all BECx team members. The BECxP shall update and maintain the BECx Plan throughout the project as it progresses to reflect changes in scope, design, and construction.
- D. BECx Issues Log: The BECxP shall establish the format and management protocol for the issues log and document detailed descriptions of all design, installation, and performance deficiencies that deviate from the Owner's Project Requirements (OPR). The BECxP shall assign and track responsible parties for each issue, monitor response and corrective action timelines, and coordinate resolution. Upon completion of corrective actions, the BECxP shall verify compliance and formally close each item in the issues log.
- E. BECx Specifications: The BECxP shall develop project-specific Building Enclosure Commissioning (BECx) specifications based on the UMB Master Specification, formatted for inclusion in the Project Manual. The specification shall include a comprehensive test matrix identifying the enclosure assemblies to be tested, along with the applicable test methods, standards, and acceptance criteria for each test.

- F. Operation and Maintenance Manuals: The BECxP shall provide operation and maintenance manuals, that includes manufacturer maintenance instructions and required care procedures for the enclosure system, preventive maintenance procedures and schedules, warranties and any warranty maintenance conditions.
- G. Final BECx Report: The BECxP shall consolidate all enclosure commissioning activities into a single coherent record, including design review comments and resolutions, submittal reviews, site observation reports, test plans and results, issues log, operating and maintenance manuals for enclosure system.

1.7 RESPONSIBILITIES

- A. The responsibilities of all parties involved in the commissioning process and Building Enclosure Commissioning (BECx) process are defined in this section.
- B. Design Team: Architect / Engineer:
 - 1. Pre-Design Phase:
 - a. Review Owner's Project Requirements (OPR).
 - 2. Design-Phase:
 - a. Based on Owner's Project Requirements (OPR), develop Basis of Design (BOD).
 - b. Develop design packages and construction documents.
 - 3. Pre-Construction Phase:
 - a. Attend BECx construction kickoff meeting.
 - b. Provide input to BECx Plan.
 - c. Review submittals and respond to RFIs.
 - d. Review and respond to BECxP's comments on submittals, shop drawings, and RFIs.
 - 4. Construction Phase:
 - a. Attend BECx meetings.
 - b. Review submittals and RFIs.
 - c. Review and respond to site observation reports provided by BECxP.
 - d. Review resolutions and action items provided by BECxP.
 - 5. Closeout, Occupancy and Operations Phase:
 - a. Review the Updated Owner's Project Requirements (OPR) and Operation and Maintenance Manuals.
- C. BECx Provider (BECxP):
 - 1. Pre-Design Phase:
 - a. Prepare and attend BECx kick-off meeting.
 - b. Provide assistance with Owner's Project Requirements (OPR) and BECx budget and scope.
 - c. Develop issues and resolution log format and protocols.
 - d. Develop initial BECx Plan.
 - 2. Design-Phase:

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- a. Conduct design phase BECx kick-off meeting.
 - b. Review Basis of Design (BOD).
 - c. Update BECx plan and issues to the project team.
 - d. Develop and finalize draft BECx specifications and test plan.
 - e. Prepare and provide design checklists.
 - f. Review design packages and conduct integration meetings.
 - g. Perform BECx focused reviews.
3. Pre-Construction Phase:
 - a. Conduct BECx construction kickoff meeting.
 - b. Update BECx Plan.
 - c. Review and provide technical assistance on submittals, RFIs, and shop drawings.
 - d. Observe Performance Mock Up (PMU) construction and testing.
 - e. Attend pre-installation meetings.
 - f. Review QA/QC program checklists from CM/GC.
 - g. Develop and update BECx issues log.
 4. Construction Phase:
 - a. Conduct BECx meetings in construction phase.
 - b. Conduct site observations.
 - c. Continue updating BECx issues log.
 - d. Observe functional performance tests.
 - e. Assist team with resolution of action items.
 - f. Review project turnover documents from CM/GC.
 - g. Review Operation and Maintenance Manuals from CM/GC.
 - h. Prepare BECx report.
 5. Closeout, Occupancy and Operations Phase:
 - a. Verify operation and maintenance training.
 - b. Perform 10 month warranty review.
 - c. Update Owner's Project Requirements (OPR) and Operation and Maintenance Manuals.
 - d. Compile and issue final BECx report.
 - e. Coordinate follow-up testing if needed.
- D. Construction Manager (CM) / General Contractor (GC):
1. Pre-Construction Phase:
 - a. Attend BECx construction kickoff meeting.
 - b. Provide input to BECx Plan and review BECx Plan.
 - c. Provide construction schedule.
 - d. Submit enclosure submittals.
 - e. Coordinate and construct performance mock up.
 - f. Conduct pre-installation meetings.
 - g. Develop QA/QC program checklists.
 2. Construction Phase:
 - a. Attend BECx meetings.
 - b. Review and respond to site observation reports that provided by BECxP.
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- c. Coordinate and provide support to enclosures Functional Performance Tests (FPT).
- d. Conduct required enclosure testing.
- e. Assemble project turnover documents.
- f. Compile Operation and Maintenance Manual.
- g. Review BECx report.

E. Owner / Owner's representatives

- 1. Pre-Design Phase:
 - a. Select qualified BECxP.
 - b. Develop BECx scope.
 - c. Review Owner's Project Requirements (OPR).
 - d. Review initial BECx plan.
- 2. Design-Phase:
 - a. Review Basis of Design (BOD).
 - b. Attend design package review and integration meetings.
 - c. Review BECx specifications and test plan.
- 3. Pre-Construction Phase:
 - a. Attend BECx construction kickoff meeting.
 - b. Review BECx Plan.
- 4. Construction Phase:
 - a. Attend BECx meetings.
 - b. Review site observation reports.
 - c. Adjudicate identified BECx action items.
 - d. Review project turnover documents.
 - e. Review Operation and Maintenance Manual.
 - f. Review BECx report.
- 5. Closeout, Occupancy and Operations Phase:
 - a. Conduct occupancy and operations planning meeting.
 - b. Collect O&M staff and occupant's feedback.

1.8 APPLICABLE STANDARDS

- A. NIBS Guidelines 3-2012, "Exterior Enclosure Technical Requirements for the Commissioning Process".
- B. ASTM E 2813, "Standard Practice for Building Enclosure Commissioning".
- C. ASTM E 2947, "Standard Guide for Building Enclosure Commissioning".
- D. ASHRAE Standard 202-2018 (or latest adopted edition), "Commissioning Process for Buildings and Systems".
- E. ASHRAE Guideline 0-2019 (or latest adopted edition)– "The Commissioning Process".
- F. Reference standards as identified in the test plan.

- G. Current LEED requirements.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. Provide all equipment necessary to perform testing of systems and components included in the commissioning scope. All testing instruments shall be of appropriate type, quality, and accuracy to measure system performance within the specified tolerances.
- B. Pressure Test Equipment
 - 1. Each airflow measurement system, including blower door fans and trailer mounted fan assemblies shall be calibrated within the last five (5) years. Equipment shall demonstrate measurement accuracy within 5% of the recorded airflow reading.
- C. The thermal imaging camera used for thermographic testing shall meet the following minimum performance criteria:
 - 1. Thermal sensitivity (NETD): $\leq \pm 0.1^{\circ}\text{C}$ at 30°C ($\leq 0.18^{\circ}\text{F}$ at 86°F)
 - 2. Operating spectral range: 2–15 micrometers
 - 3. IR image resolution: minimum 320×240 pixels
 - 4. Integrated image capture and storage capability
 - 5. Ability to export individual still-frame thermal images in digital format
 - 6. Compatibility with electronic thermographic investigation reports, including image insertion and documentation

PART 3 - EXECUTION

3.1 MEETINGS

- A. Attend all meetings in accordance with 019113 General Commissioning Requirements.
- B. The CM/GC shall provide timely updates to the construction schedule to ensure the BECxP has the information necessary to plan and execute the commissioning process efficiently. The CM/GC shall promptly notify the Owner or Owner's Representative of any anticipated construction delays that may impact commissioning activities, whether such activities have been scheduled or not yet performed.
- C. BECx Kick-Off Meeting:
 - 1. Clarify the Owner's Project Requirements (OPR) for the building enclosure and define the methods for verifying compliance.
 - 2. Review the draft BECx plan, including scope, testing strategy, and documentation requirements.
- D. Design Phase BECx Meeting:

1. Verify that the enclosure design (SD/DD/CD) aligns with the OPR and Basis of Design (BOD) to achieve the intended performance.
2. Review and refine the BECx plan and project-specific BECx specifications, including scope, testing, mock-ups, and documentation requirements
3. Identify and address enclosure risks and coordination gaps early in the design and planning process.

E. BECx Construction Kick-Off Meeting:

1. Translate the BECx plan and contract requirements into actionable construction expectations, identifying critical details, required tests, and procedures for documenting and resolving issues.
2. Coordinate schedules, sequencing, and site access for mock-ups, pre-installation meetings, field observations, and performance testing of building enclosure systems.
3. Clarify roles and communication protocols among the CM/GC, building enclosure subcontractors, BECxP, A/E, and owner representatives.

F. Construction Phase BECx Meeting:

1. Participate periodically during active enclosure work, addressing coordination, deficiency resolution, and planning matters during these meetings.

G. Occupancy and Operations Planning Meeting:

1. Establish an envelope operations and maintenance (O&M) strategy to preserve long-term performance and durability.
2. Define facilities staff training, documentation, and responsibilities to ensure early identification, reporting, and response to building enclosure issues.
3. Set post-occupancy performance expectations, including scheduled reviews, warranty inspections, and seasonal or targeted follow-up testing as required.

3.2 REPORTING

- A. Prepare and maintain the BECx Plan, updating it at major design and construction milestones, and re-issue to the project team.
- B. Establish, maintain, and regularly distribute the issues log, documenting the status of all enclosure-related items.
- C. Prepare design review reports for each required submission, capturing comments, risks, and recommended corrective actions. Back-check and re-issue updated reports after the design team responds, clearly identifying items that are resolved, revised, or remain open.
- D. Issue field observation reports after each enclosure site visit, including date, areas observed, photos, non-conforming work, and recommended actions.

- E. Review and comment on enclosure-related submittals, shop drawings, RFIs, and change orders, documenting comments in a format coordinated with the design team and CM/GC.
- F. Review construction checklists prepared by the CM/GC and report deficiencies or trends that may affect enclosure performance.
- G. Coordinate test plans and review field test reports provided by the testing agent.
- H. Compile the operation and maintenance manual for the building enclosure.
- I. Provide a BECx report at substantial completion and update the final BECx report following the 10-month warranty review.

3.3 COMMISSIONING SITE OBSERVATION

- A. The BECxP will conduct periodic site visits to monitor work progress and evaluate compliance with the Contract Documents, OPR, and industry standards. The Contractor shall coordinate access for the BECxP to review the work.
 - 1. The BECxP will identify noncompliant work, report findings to the CM/GC and Architect of Record (AOR), and provide a summary report of observations. The summary report will include a list of noncompliant items, serving as an ongoing construction issues log updated after each site visit. The A/E shall review all noncompliant items and provide directions for corrective action.
 - 2. The Contractor shall notify the A/E and BECxP immediately after completing any remedial work and before covering the work. Photographic documentation of remedied conditions is acceptable only if previously approved by the A/E and BECxP.
- B. The BECxP shall perform site observations at intervals sufficient to observe critical enclosure installations and transitions before concealment.
 - 1. Minimum observation milestones shall include:
 - a. Waterproofing system installation, including flashings and terminations.
 - b. Air barrier installation, including continuity at penetrations and transitions.
 - c. Fenestration installation, including flashing and integration with air/water barriers.
 - d. Sealant installation, including joint substrate conditions and tooling.
 - e. Building expansion joints, including continuity of air, water, and vapor barrier across movement joints.
 - f. Roofing installation, including terminations, penetrations, and field seams.
 - g. Final enclosure completion, verifying all interfaces and transitions are complete.
 - 2. Additional observations shall be performed when deficiencies or recurring installation issues are identified.
- C. The CM/GC shall provide minimum 72-hour notice prior to concealment of critical enclosure assemblies requiring observation by the BECxP.

3.4 PREFUNCTIONAL CHECKLISTS

- A. Development of Test Procedures: The BECxP shall develop specific test procedures and forms to verify and document the proper operation of each assembly. Subcontractors or vendors responsible for executing a test shall provide limited assistance to the BECxP, such as answering questions regarding equipment, operation, and sequences. Prior to test execution, the BECxP shall provide the procedures to the Sub(s) for review of feasibility, safety, equipment requirements, and warranty protection. The BECxP may submit procedures to the A/E for review if requested. Representative test formats and examples (not specific to this project) are included at the end of this Section.
- B. Coordination and Scheduling: Subs shall provide the BECxP with sufficient notice of the completion schedule for prefunctional checklists of all assemblies. The BECxP will coordinate functional performance test scheduling with the CM and affected Subs, and shall direct, witness, and document the testing. Subs are responsible for executing the tests.
- C. The BECxP will recommend solutions for issues identified during testing; however, responsibility for correcting, resolving, and retesting problems rests with the CM/GC, Subs, and A/E.
- D. Prefunctional Checklist:

TASKS	RESPONSIBLE	ASSISTANCE	DELIVERABLE	SCHEDULE MILESTONE
Submittals and Shop Drawings	GC		Approved Shop Drawings and Submittals	Prior to start of construction of every enclosure related system
In-place mock-ups	GC		Initial Installation of new assemblies at locations determined by BECxP, BE, and A/E	Prior to proceeding with complete installation of new assemblies
Sealant compatibility and adhesion tests ASTM C 1521	MFG	GC	Written test report and approval letter	Prior to the installation of sealant at each substrate type on the project, (usually on the mock up)
Waterproofing and Air Barrier Adhesion Testing	MFG	GC	Written test report and approval letter	Prior to installation of systems (usually on the mock up)
Site Inspections	A/E, BECxP	GC	Site Visit Report	Periodically during construction

1. Abbreviations:
- GC – General Contractor
 - MFG – Manufacturer
 - A/E – Architect / Engineer
 - BECxP – Building Enclosure Commissioning Provider

3.5 IN-SITU TESTING

- A. General Testing Requirements

1. Testing locations shall be selected by the BECxP and Architect of Record (AOR).
2. Additional testing may be required where deficiencies are identified.
3. Deficiencies identified during testing shall be corrected and retested at no additional cost to the owner.

B. Whole Building Airtightness Testing

1. Whole building airtightness testing shall be performed in accordance with the following test methods, as determined by the testing agency based on building size and configuration:
 - a. ASTM E779 for single-zone buildings, with strict weather limitations, or
 - b. ASTM E1827 for single-zone buildings using an orifice blower door, or
 - c. ASTM E3158 for large or multizone buildings.
2. The Maximum allowable air leakage rate shall not exceed 0.25 cfm/sf of total enclosure area at 0.3 in.w.g. (75 Pa), unless otherwise required by the Owner's Project Requirements (OPR) or applicable energy code.

Building Enclosure System or Component	Spec Section	Specified Test Standard	BECx Observation Required	Frequency of Testing	Failure Criteria
Whole Building		ASTM E779, or ASTM E 1827, or ASTM E3158 Building Airtightness Testing	YES	1 test	0.25 cfm/sf @ 0.3 in.w.g. (75Pa)
Whole Building		ASTM C 1060 Thermography Testing	YES	To be performed in conjunction with ASTM E 783 (Diagnostic)	
Whole Building		ASTM E 1186	YES	To be performed in conjunction with ASTM E 783 (Diagnostic)	

Building Enclosure System or Component	Spec Section	Specified Test Standard	BECx Observation Required	Frequency of Testing	Failure Criteria
Glazed Aluminum Curtain Walls	084413	ASTM E 783 (Air Leakage Volume test)	YES	6 tests (1 at mock up, 2 at 5%, 2 at 50%, and 1 at 90% completion)	0.06 cfm/sf @1.57 psf. If failure occurs; conduct 2 additional tests
Glazed Aluminum Curtain Walls	084413	ASTM E 1105 (Water Penetration test)	YES	6 tests (1 at mock up, 2 at 5%, 2 at 50%, and 1 at 90% completion)	No leakage on any interior surfaces or any part of the assembly intended to be a dry zone if failure occurs; conduct 2 additional tests
Glazed Aluminum Curtain Walls	084413	AAMA 501.1 (Dynamic Water Penetration)	YES	6 tests before installation of interior finishes	No leakage on any interior surfaces or any part of the assembly intended to be a dry zone if failure occurs; conduct 2 additional tests

Building Enclosure System or Component	Spec Section	Specified Test Standard	BECx Observation Required	Frequency of Testing	Failure Criteria
Glazed Aluminum Curtain Walls	084413	AAMA 501.2 Water-Spray Test	YES	3 tests (2% of the total mullion length) on separate units along head, sill and intermediate mullion after completion of curtain wall installation	If testing reveals consistent deficiencies, test 100 percent of assembly, remediate deficient areas, and retest.
Structural Glass Facades	084426	AAMA 501.2 Water-Spray Test	YES		
Sheet Waterproofing	071326	ASTM D 4541 (Field Adhesion Testing)	YES	1 test for each 1,000 square feet	
Hot Fluid-Applied Waterproofing (before installation of overburden)	071413	ASTM D 7877 (Electronic Leak Detection)	YES	1 test for each roof installation	
Hot Fluid-Applied Waterproofing (before installation of overburden)	071413	ASTM D 4263 (Concrete Moisture Test)	YES	1 test for each roof installation	
Hot Fluid-Applied Waterproofing (before installation of overburden)	071413	ASTM D 5957 (Flood Testing)	YES	1 test for each roof installation	

Building Enclosure System or Component	Spec Section	Specified Test Standard	BECx Observation Required	Frequency of Testing	Failure Criteria
Hot Fluid-Applied Waterproofing (before installation of overburden)	071413	Membrane Thickness Test	YES	Membrane Thickness Testing distributed throughout installation at testing frequency of 1 test/100 sq.ft.	
Hot Fluid-Applied Waterproofing	071413	Adhesion Testing (qualitative pull adhesion testing)	YES		
Under-slab Vapor Retarders	072616	Inspections	YES		
Modified Bitumen Sheet Air Barriers	072713	ASTM C 1193 or ASTM C 794 Adhesion Field Test	NO	preconstruction field-application testing	
Fluid-Applied Membrane Air Barriers	072726	Inspections ASTM 1186 & ASTM E 783 Air-Leakage Testing ABAA T0002	YES		0.04 cfm/sf @1.57 psf.
2-ply modified bitumen roof	075423	ASTM D 7877 (Electronic Leak Detection) ASTM C 1153 (Infrared Testing)	YES	1 test for each roof installation	

Building Enclosure System or Component	Spec Section	Specified Test Standard	BECx Observation Required	Frequency of Testing	Failure Criteria
Joint Sealants	079200	ASTM C 1521, Method A (Field Adhesion Testing)	NO	10 tests for the first 1000 feet of joint length, 1 test for each 1,000 feet of joint length	Water penetration past the primary seal
Exterior Expansion Joint Cover Assemblies	079513	AAMA 501.2 Water-Spray Test	YES		

3.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

- A. Documentation: The BECxP shall witness and document the results of all performance tests using the procedural forms developed for each test. Prior to testing, these forms shall be provided to the CM/GC for review and approval, and to the Subs for review. Completed forms will be included in the turnover documents.
- B. Non-Conformance:
1. The BECxP shall record all test results on the applicable procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the CM.
 2. Minor deficiencies may be corrected during testing at the discretion of the BECxP. Such corrections and resolutions shall be documented on the procedure form.
 3. Testing shall be conducted efficiently to minimize delays while maintaining full compliance with specified procedures and acceptance criteria. The BECxP shall not overlook deficient work or relax acceptance criteria to meet schedule or cost objectives, unless directed by the owner.
 4. As tests progress and a deficiency is identified, the BECxP shall discuss the issue with the executing GC.
 - a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
 - 1) The BECxP documents the deficiency and the Sub's corrective response. Testing proceeds to the next item. The Sub corrects the deficiency at no cost to the Owner, signs the statement of correction on the non-compliance form, and returns it to the BECxP.
 - 2) The BECxP reschedules and repeats the test.
 - b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

- 1) Document the deficiency and the Sub's response on the nonconformance form; copies provided to the CM/GC and the responsible Sub representative.
 - 2) Resolve at the lowest management level possible, involving other parties as needed. Final interpretive authority rests with the A/E; final acceptance authority rests with the owner.
 - 3) The BECxP documents the resolution process.
 - 4) Once resolved, the responsible party corrects the deficiency, signs the statement of correction, and submits it to the BECxP. The BECxP reschedules and repeats the test until satisfactory performance is achieved.
5. The CM/GC shall provide written updates to the BECxP, A/E, and owner's representatives at least as frequently as commissioning meetings are scheduled, addressing the status of each outstanding discrepancy, including explanations of disagreements and proposed resolutions.
 6. The BECxP shall retain all original non-conformance forms until project completion.
 7. Any retesting required by a CM/GC shall not constitute a valid basis for a delay claim or time extension by the prime contractor.
- C. Approval: The BECxP shall note satisfactory demonstration of each function on the test form. Formal approval of functional performance tests occurs later, following review by the BECxP and, if necessary, the owner. The BECxP shall recommend test acceptance to the owner. Final approval is provided by the owner through signature on the test document.

3.7 BUILDING ENCLOSURE MOCK-UP (IN-SITU)

- A. General: Mock-ups are essential to verify that building enclosure construction meets contract requirements and the facility's performance needs. They allow inspection and validation of materials, installation techniques, and system integrity before components are installed on the building. Mock-ups must be successfully evaluated and approved prior to field installation.
- B. Mock-Up Evaluation Program: The Architect of Record (AOR) shall assist the Contractor responsible for assembling mock-ups in developing a detailed mock-up evaluation program. The AOR's primary role is to ensure a written plan exists to facilitate proper completion of procedures. Subs responsible for mock-up assembly and testing are identified during the commissioning scoping meeting.
1. The BECxP meets with the installing Subs to review the need for mock-ups of specific enclosure areas and configurations, including requirements and responsibility for each.
 2. Subs develop procedures for each mock-up, detailing materials, installation techniques, inspections, and testing requirements. Procedures are submitted to the BECxP for review and approval.
 3. The BECxP reviews and approves the procedures and documentation format, noting any additional procedures required.

C. Execution of Mock-Up Program:

1. Once approved, mock-up assembly may begin under the direction and execution of the responsible Sub or vendor.
2. At least four weeks prior to mock-up completion, Subs and vendors shall schedule the evaluation with the CM/GC and BECxP.
3. The BECxP shall inspect each mock-up and observe required testing, which is performed by the installing contractor.
4. The BECxP shall document inspection and testing results, including any deficiencies, and submit a report to the owner.

D. Deficiencies, Non-Conformance and Approval of Mock-Ups

1. Subs shall list any outstanding items from the initial mock-up inspection and testing on the procedures form or an attached sheet and provide it to the BECxP within two days of test completion.
2. The BECxP reviews the report and issues either a non-compliance report or an approval form to the Sub or CM/GC. The BECxP coordinates with Subs and vendors to correct and retest deficiencies or incomplete items, involving the CM/GC or others as necessary. Once all deficiencies are corrected, the BECxP recommends approval of the mock-up configuration to the CM/GC.
3. Items left incomplete that later cause deficiencies or delays during functional testing may result in back charges to the responsible party.

3.8 REPAIR AND PROTECTION

- A. The CM/GC is responsible for all repair and protection, regardless of the assignment of responsibility for testing, inspection, sampling, or similar services. Following completion of inspections, testing, sampling, or other quality control activities, the CM/GC shall:
1. Repair any construction damage during such activities using materials and methods consistent with the Contract Documents.
 2. Restore substrates, finishes, and affected construction to their original condition.
 3. Provide protection for construction exposed by quality control activities.
 4. Protect all repaired construction from subsequent damage.

3.9 TRAINING

- A. BECxP shall coordinate, schedule, and document training for all commissioned building enclosure systems. Training shall be conducted in accordance with the requirements specified in Section 019113, General Commissioning Requirements.

3.10 FINAL BECx REPORT

- A. The BECxP shall provide a final Building Enclosure Commissioning (BECx) report that includes all information generated during the BECx process, including, but not limited to:

1. BECx meeting minutes
 2. Design review reports
 3. Test reports
 4. Final Owner's Project Requirements (OPR)
 5. Basis of Design (BOD)
 6. Final BECx Plan
 7. Issues log
 8. Site observation reports
 9. As-built drawings provided by the CM/GC
 10. Submittals
 11. Record of training
 12. Operation and maintenance manuals
- B. The BECxP shall ensure the final BECx report is included as part of the project's final commissioning report, in accordance with Section 019113, General Commissioning Requirements. The report shall be submitted within 14 calendar days of completion of all commissioning activities, including the 10-month warranty review.

END OF SECTION 019115