

CONTRACT MODIFICATION PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the administrative and procedural requirements for executing a change in the Work as herein specified and further described in Article 9 of the General Conditions.
- B. Owner's forms references in this Section include (see Appendix A):
 - 1. Change Order Proposal;
 - 2. Change Order Transmittal;
 - 3. COP Design-Builder Breakdown Summary;
 - 4. COP Design-Build Subcontractor Breakdown Summary;
 - 5. COP Cost Breakdown;
 - 6. COP Wage Rates; and
 - 7. COP Equipment Rates.

1.2 PRELIMINARY REQUIREMENTS:

- A. Prior to submitting a Change Order Proposal (COP), the Design-Builder shall submit a breakdown of journeyman and apprentice, where applicable, wage rates using the Owner's COP Wage Rates form. The breakdown shall show:
 - 1. Basic wage rate (based on L&I Intent to Pay Prevailing Wages or union agreement);
 - 2. Fringe Package (based on L&I Intent to Pay Prevailing Wages or union agreement);
 - 3. FUI (Federal Unemployment Insurance);
 - 4. FICA (Federal Insurance Compensation Act);
 - 5. Medicare;
 - 6. SUI (State Unemployment Compensation Act);
 - 7. WC (Workers Compensation).
- B. Design-Builder shall submit verification of the above rates, if requested by Owner's Representative.
- C. Prior to submitting a COP that involves equipment owned by the Design-Builder, the Design-Builder shall submit a list of all equipment anticipated to be used on the Project. Design-Builder shall provide the hourly rate based on the Equipment Watch Rental Rate Blue Book and as modified by the current AGC/WSDOT Agreement or other sources as referenced in the Contract Documents. The Design-Builder shall use the Owner's COP Equipment Rates form to compute the equipment rate.

1.3 CHANGE ORDER PROCEDURES

- A. Change Order Proposal (COP): Changes may be initiated at Owner's request through a COP form prepared and submitted by the Design-Builder. Such a request is for information and pricing only and is not an instruction to execute changes or to stop work in progress, unless issued as a Field Order.
 - 1. The COP will include:
 - a. A detailed description of changes, products, and location of modification in Project and a statement as to whether overtime work is authorized;

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- b. Description of proposed changes;
 - c. Reason for making changes;
 - d. A specific period of time during which requested price will be considered valid;
 - e. Actions required by Owner;
 - f. Effect on Guaranteed Maximum Price, and/or Contract Time, as indicated;
 - g. Documentation consistent with the requirements of the Contract Documents supporting any change in Guaranteed Maximum Price, and/or Contract Time, as indicated;
 - h. Statement of why proposed change is not covered in Contract Documents
 - i. Date the Work is to be completed; and
 - j. Supplementary or revised Drawings or Specifications.
 2. An updated Project Schedule may be requested if the COP impacts the existing Project Schedule.
- B. Change Order Pricing:
1. The cost of the changes are described in Article 9 of the General Conditions.
 2. Design-Builder shall provide all backup pricing documentation for a change on the following forms (THESE FORMS SHALL ALSO BE THE ONLY ACCEPTABLE DOCUMENTATION FOR ALL SUBCONTRACTORS.):
 - a. COP Design-Builder Breakdown Summary
 - b. COP Design-Build Specialty Consultant/Trade Contractor Breakdown Summary
 - c. COP Cost Breakdown
 3. Owner's Representative may require Design-Builder to provide certified payroll.
 4. Provide all other supporting documentation as required to substantiate the requested costs such as invoices for rental equipment and freight cost. Total cost and time shall be brought forward to the COP form and signed and dated by Design-Builder.
- C. Field Order: In situations where time is of the essence or an emergency condition exists, the Owner's Representative may directly order a change to the Work by a written Field Order signed by Owner's Representative. Field Orders will only be issued on an agreed upon not-to-exceed cost basis, either lump sum or time and materials.
- D. Change Order Authorization:
1. Upon signature and execution by Owner, the Change Order Proposal becomes a Change Order altering the Guaranteed Maximum Price, and/or Contract Time, as indicated.
 2. Design-Builder may only request payment for changes in the Work against an approved Change Order.
 3. If Owner disapproves the Change Order Proposal, the reason for disapproval will be stated. A request for a revised proposal or cancellation of the proposal will be shown and returned to the Design-Builder.

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E. Correlation with Design-Builder's Submittals:

1. Application of Payment forms shall record each Change Order as a separate item of work (see Section 01 29 76, "Progress Payment Procedures").
2. Revise Project Schedule to reflect changes in Contract Time.
3. Upon completion of Change Order work, record pertinent modifications in the Project Record documents.

F. Distribution:

1. Upon authorization of a Change Order, Owner will transmit one (1) signed copy to Design-Builder.

PART 2- PRODUCTS (Not Used)

PART 3- EXECUTION (Not Used)

END OF SECTION

PROGRESS PAYMENT PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the administrative and procedural requirements for Design-Builder progress payment and release of retainage as herein specified.
- B. Owner's forms referenced in this Section include (see Appendix A):
 - 1. Application and Certificate for Payment on Contract (Application for Payment)
 - 2. Construction Invoice Voucher
 - 3. Retainage Invoice Voucher
 - 4. Monthly Specialty Consultant/Specialty Trade Contractor List and Certifications
 - 5. Statement of Intent to Pay Prevailing Wages and Affidavit of Wages Paid Information
 - 6. Certificate of Payment of Labor and Materials
 - 7. Apprentice and Journey Level Worker Utilization Report

1.2 PREREQUISITES FOR FIRST APPLICATION FOR PAYMENT

- A. Prevailing Wage Forms: Submit Statement of Intent to Pay Prevailing Wages form, approved by the Department of Labor and Industries, prior to commencing the Work. The Owner will not make payment on an Application for Payment until the Design-Builder has an approved Intent on file with the Department of Labor and Industries for the Design-Builder and every Specialty Trade Contractor of every tier that performed work during the payment period and are included in an Application for Payment. The form shall list every classification of laborer, worker, or mechanic employed by the Design-Builder and its Specialty Trade Contractors. THERE ARE NO EXCEPTIONS TO THIS REQUIREMENT.
 - 1. The website address link to the prevailing wage forms is included in Appendix A.
 - 2. The website address link to the "Washington State Prevailing Wage Rates for Public Works Contracts" is included in Appendix B.
- B. Schedule of Values: Submit and receive approval of the Schedule of Values in accordance with this section and Article 7 of the Agreement. Before submitting the first Application for Payment, submit and receive approval of the Schedule of Values allocating the detail of the Guaranteed Maximum Price, in a breakdown acceptable to the Owner, which shall be documented on the Application for Payment. The approved Schedule of Values will (i) subdivide the Work into its respective parts, and (ii) serve as the basis for monthly progress payments made to Design-Builder throughout the Work. PAYMENT FOR WORK WILL ONLY BE MADE FOR, AND IN ACCORDANCE WITH, THOSE ITEMS INCLUDED IN THE APPROVED SCHEDULE OF VALUES.
 - 1. Format: On 8-1/2" x 11" paper
 - 2. Round figures to nearest dollar amount.
 - 3. Make sum of total Costs equal to the Guaranteed Maximum Price. Do not include State of Washington sales tax.
 - 4. Coordinate items of the Schedule of Values so that there is a corresponding item in the Progress Schedule.
 - 5. Revise as requested by Owner.

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- C. Specialty Trade Contractors List: Submit a list of all Specialty Trade Contractors and major material suppliers.
- D. Retainage: Submit instructions for the disposition of retainage funds.
 - 1. In accordance with Chapter 60.28 RCW, Owner shall reserve a Contract retainage in an amount not-to-exceed 5% of the moneys earned by the Design-Builder as a trust fund for the protection and payment of:
 - a. The claims of any person arising under the Contract Documents;
 - b. The State of Washington with respect to taxes imposed pursuant to Titles 50, 51, and 82 RCW which may be due from the Design-Builder, and;
 - c. The Owner for claims it may have against the Design-Builder.
 - 2. Design-Builder's written instructions should be addressed to the University of Washington, Project Delivery Group, Accounting Department, Box 352205, Seattle, Washington 98195 - 2205.
 - 3. At the option of the Design-Builder, the moneys reserved by the Owner shall be:
 - a. Retained in a fund by the Owner; or
 - b. Bonded by the Design-Builder (if approved by Owner) for all of the Contract retainage in a form acceptable to the Owner; or
 - c. Deposited by the Owner in an Owner's interest bearing account in a bank, mutual savings bank, or savings and loan association; or
 - d. Placed in escrow with a bank or trust company by the Owner.
 - (1) Escrow Agent: If the retained funds are to be placed in escrow, Design-Builder will select the escrow agent, subject to approval by the Owner. The selected agent must be a bank or trust company in the State of Washington.
 - (2) Escrow Agreement: Pursuant to electing the escrow option, an escrow agreement shall be executed by Design-Builder, Owner, and bank. A completed and signed escrow agreement in a form acceptable to the Owner must be on file with the Owner for payment before the Design-Builder's first Application for Payment is processed.
 - (3) Escrow Payments: As each progress estimate is presented for payment, Design-Builder shall make a voucher request for the retained funds that are to be placed in escrow. Such requests should be prepared on the Owner's Retainage Invoice Voucher form and submitted in four (4) copies with the related Application for Payment. Upon receiving a retainage invoice, the Owner will issue a check payable to the Design-Builder and the bank jointly. Such checks will be mailed to the bank and the Design-Builder will receive copies of check transmittal letters.
 - (4) Escrow Investments: The bank shall invest the retained funds in bonds and other securities selected by the Design-Builder from the following list approved by the Owner:

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- (a) Bills, certificates, notes or bonds of the United States;
 - (b) Other obligations of the United States or its agencies;
 - (c) Obligations of any corporation wholly owned by the government of the United States;
 - (d) Indebtedness of the Federal National Mortgage Association;
 - (e) Time deposits in commercial banks, mutual savings banks, and savings and loan associations in the State of Washington;
 - (f) Deposits in savings accounts in commercial banks, mutual savings banks, and savings and loan associations in the State of Washington.
- (5) The investments selected must mature on or prior to the date set for Substantial Completion, including extensions thereof or no later than forty five (45) days following the Final Acceptance of the Work. Interest on such investments shall be paid to the Design-Builder by the escrow agent as it accrues.
- (6) Escrow Costs and Fees: All escrow costs and fees shall be paid by the Design-Builder, in accordance with the escrow agreement.

1.3 DRAFT APPLICATION FOR PAYMENT

- A. On or about the twenty-fifth (25th) of each month, the Design-Builder shall submit to the Owner a draft Application for Payment for the Work properly performed during the current calendar month in accordance with this section and Article 7 of the Agreement. Include projected costs to the end of the month in the pay request. Provide the following documents (draft documents may be marked by hand):
- 1. Application and Certificate for Payment on Contract form: Fill in required information.
 - a. Mechanical and Electrical Specialty Trade Contractors' draft monthly payment requests shall be submitted, for review and comment, prior to Owner's review of the Design-Builder's draft monthly Application for Payment.
 - b. List Change Orders approved prior to the submission date individually (last on the form). Use Owner's Change Order designation and description (similar to an original component item of work). **DO NOT BILL FOR CHANGE ORDER PROPOSALS UNTIL AN APPROVED CHANGE ORDER HAS BEEN RECEIVED FROM THE OWNER INCORPORATING THE PROPOSAL.**
 - 2. Monthly Specialty Consultants/Specialty Trade Contractors List and Certifications form.
 - 3. Stored Materials: The Design-Builder is solely responsible for the stored materials. Requests for payment on materials stored shall be for materials properly stored on the Project site. Payment for materials stored off-site shall be at the sole option of the Owner and comply with conditions stipulated by the Owner. These conditions may include, but are not limited to:

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- a. Provide supplier invoice
- b. Provide insurance or a bond to cover the total loss of material and time impact to Project
4. Monthly Project Schedule updates with change in Contract Time analysis.
5. Apprentice and Journey Level Worker Utilization Report.

1.4 APPLICATION FOR PAYMENT

- A. On or before the tenth (10th) day of each month, beginning with the first month after the commencement, the Design-Builder shall submit to the Owner two (2) hardcopies of the Application for Payment for the Chargeable Costs of the Work properly performed during the previous calendar month to the Owner in accordance with this section and Article 7 of the Agreement.
- B. The Design-Builder is cautioned to carefully check all extensions, totals, and required information for accuracy before submittal.
- C. Applications are to be signed by a responsible officer of the Design-Builder.
- D. The Application for Payment shall include the following Owner forms and documents:
 1. Application and Certificate for Payment on Contract
 2. Construction Invoice Voucher (for the total amount due)
 3. Retainage Invoice Voucher (for the retainage amount)
 4. Monthly Specialty Consultants/Specialty Trade Contractors List and Certifications
 5. Invoices for materials stored off-site
 6. Apprentice and Journey Level Worker Utilization Report
- E. Contractor, subcontractor, or employer shall file a copy of its certified payroll records directly with the Department of Labor and Industries online system at least once per month.
- F. When the Owner's Representative finds the Application for Payment properly completed and correct, they will sign and transmit all copies of the Application for Payment to the Capital Planning & Development Accounting Department for processing.
- G. If the Owner finds the Application for Payment improperly or incorrectly executed, an annotated copy will be returned for a new submittal.
- H. Only minor corrections are allowed on the original, with approval of Owner.

1.5 PRIOR TO FINAL APPLICATION FOR PAYMENT

- A. The final Application for Payment request will be accepted for processing only after providing satisfactory completion of the following:
 1. Application and Certificate for Payment on Contract

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2. Construction Invoice Voucher (for the total amount due)
3. Retainage Invoice Voucher (for the retainage amount)
4. Monthly Specialty Consultants/Specialty Trade Contractors List and Certifications
5. Invoices for materials stored off-site
6. Final Completion procedures of the Agreement and Section 01 77 00 "Closeout Procedures"
7. Final Schedule of Values "Final Actual Cost"
8. "Building Componentization Report" allocating the Final Actual Cost to each of the following categories:
 - a. Site Preparation
 - b. Exterior construction
 - c. Foundations and building structure
 - d. Exterior walls
 - e. Roofing
 - f. Interior construction
 - g. Floor covering
 - h. Fixed equipment
 - i. Elevators
 - j. HVAC
 - k. Plumbing and piping
 - l. Fire protection
 - m. Lighting and electrical
9. Apprentice and Journey Level Worker Utilization Report

1.6 RELEASE OF RETAINAGE

- A. Pursuant to the completion of Work performed in accordance with the Agreement and Final Acceptance by the Owner, the following requirements must be satisfied prior to the release of retained Contract funds.
 1. "Notice of Completion of Public Works Contract (REV 31 0020)": This Department of Revenue form will be completed by the Owner, establishing the date of Final Acceptance thereon. Three copies of the notice will be mailed to the Department of Revenue and a copy will be transmitted to Design-Builder.
 2. "Certificate of Payment of State Excise Taxes by Public Works Design-Builder (REV 31 0028)": Following receipt of the Owner's Notice of Completion of Public Works Contract form and after determining that all taxes, interest and penalties due from Design-Builder have been paid, the Department of Revenue will issue this certificate to Owner, thereby notifying the Owner that it has no objection to the release of retainage to the Design-Builder.
 3. "Certificate of Payment of Contributions, Penalties and Interest on Public Work Contract (EMS 8449 760)": Upon receiving a copy of the Owner's Notice of Completion of Public Works Contract form from the Department of Revenue and determining that the Design-Builder is in compliance with the provisions of the Employment Security Act, the Employment Security Department will issue this certificate to Owner, thereby

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notifying the Owner that it has no objection to the release of retainage to the Design-Builder.

4. Upon receiving a copy of the Owner's Notice of Completion of Public Works Contract form and determining that the Design-Builder is in compliance with the provisions of Chapter 51 RCW for payment of industrial insurance premiums, the Department of Labor and Industries will issue a certificate for the Owner, thereby notifying the Owner that it has no objection to the release of retainage to the Design-Builder. Note that the Notice of Completion cannot be sent to the Department of Labor and Industries until all Intents and Affidavits have been approved and are on file with the Department of Labor and Industries (see item 5 below).
 5. "Affidavit of Wages Paid on Public Works Contract" (F700-007-000): An Affidavit of Wages Paid, for the Design-Builder, each Specialty Trade Contractor, and each sub-tier Specialty Trade Contractor, approved by the Industrial Statistician of the Department of Labor and Industries, must be on file with the Washington State Department of Labor and Industries. Design-Builders and Specialty Trade Contractor may file the Affidavit of Wages Paid either on-line at the website link provided in Appendix A or by completing the forms manually.
 6. "Certificate of Payment of Labor and Materials": This Owner's form shall be completed by the Design-Builder and returned to the Owner. If the only exception to full payment to all Specialty Trade Contractors is retainage owed to Specialty Trade Contractors, the appropriate box on the form should be checked.
 7. Invoice Voucher: If the retained funds are on deposit in Owner accounts, the Design-Builder shall prepare a Retainage Invoice Voucher for the total amount retained and submit to the Owner for payment. If these funds have been placed in escrow at the direction of Design-Builder, no further invoice is required.
- B. Retainage will be paid by the Owner to the Design-Builder sixty (60) days following the published date of Final Acceptance, contingent upon the Design-Builder's compliance with provisions of public works statutes and as stated above. If there are either unpaid taxes or unsatisfied claims of lien against the retained percentage, disbursement of retainage funds will be made in accordance with State of Washington law.
- C. Address all transmittal of retainage documents to the Owner's Contracts Office at: University of Washington, Project Delivery Group, Box 352205, Seattle, Washington, 98195 - 2205.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL COMMUNICATION

- A. The Owner shall designate, in writing, the Owner's Representative for this Project.
- B. All verbal communications between Owner and Design-Builder shall be for clarification and collaboration purposes and are not binding unless issued in writing through the Owner's Representative.
- C. In case of an emergency:
 - 1. Contact the Owner's Representative; and
 - 2. Follow emergency procedures in accordance with Section 01 35 23 "Owner Safety Requirements."

1.2 CORRESPONDENCE

- A. Address all correspondence to Owner's Representative.
- B. All correspondence to and from Design-Builder will be routed through the Owner's Representative.
- C. Number correspondence sequentially. Include Owner project name and number.

1.3 COORDINATION

- A. General Coordination:
 - 1. The Design-Builder will facilitate weekly (or as mutually agreed) meetings which will include representatives from the University and the Design-Builder's subconsultants and subcontractors. Design-Builder will draft minutes for Owner's editing and distribution.
 - 2. Coordinate the Work; do not delegate responsibility for coordination to an alternate party.
 - 3. Anticipate interrelationship of all Subcontractors and their relationship with the total Work.
 - 4. Resolve differences or disputes between Subcontractors and materials suppliers concerning coordination, interference, or extent of the Work.
 - 5. Cooperation with other contractors during the term of this Project may be required within the building or other adjacent locations to the construction limits of this Project. The Design-Builder is to cooperate with the Owner in coordination of all work to prevent impact to this or other Owner sponsored construction projects.

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6. The Design-Builder shall be in charge of this Contract and the Project, as well as directing and scheduling of all Work. Final responsibility for performance, interface, and completion of the Work and the Project shall be the Design-Builder's.
 7. The Design-Builder is responsible for coordinating the design and construction of the Work and encouraged to utilize pull planning and "Last Planner system" as a way of coordinating and scheduling the work.
 8. The Design-Builder will track issue or task log and measure performance of the design-build team against issue resolution or task date assigned.
- B. Special Coordination:
1. The Design-Builder is responsible for receiving, unloading, storage and handling of Owner Furnished Contractor (Design-Builder) Installed (OFCI) items from the time of receipt through Substantial Completion.
 - a. The Design-Builder is responsible for protecting OFCI and Owner Existing Contractor (Design-Builder) Installed (OECI) items from damage, such as: damage from exposure to the elements; or from damage to a warranty due to Design-Builder's improper installation and testing. The costs to repair or replace items damaged while in the Design-Builder's possession shall be borne by the Design-Builder.
 - (1) The Design-Builder shall consult with the Owner to determine the warranty requirements of OFCI and OECI items.
 2. The Design- Builder is responsible for coordinating access to the buildings with the Owner.
 3. Coordination with work of other Contractors
 4. Coordination with building occupants
 5. Coordination with Owner's custodial services
 6. Coordination Owner's security services, including:
 - (1) Escorts in sensitive areas when required
 - (2) Obtaining and displaying badges – obtain badges from Owner's Construction Manager. Forms are provided in Appendix A for security background check to be performed by UWMC. Have all employees who will be on-site fill out paperwork and coordinate badging with Owner's Representative:
 - UW Conviction/Criminal History Information form
 - WA State Patrol Request for Criminal History information
 7. Loading dock restrictions including usage times, number of spaces allowed and parking for load/unload only.
 8. Material/equipment staging areas, including parking restrictions.
 9. Access routes to and within buildings for material deliveries and debris removal.

10. Utility restrictions.
 11. Coordination of elevator use including:
 - (1) Time restrictions
 - (2) Elevator security
 - (3) Protection of elevator interior and exterior finishes.
 12. Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF) rooms early construction completion: One month minimum prior to the date required for the first inspection and testing of elevator, fire alarm systems, or other systems required by AHJ for Substantial Completion, or for Owner's Prior Occupancy, the Contractor shall complete the Work of new MDF and IDF rooms, in order for the Owner to install Owner Furnished Owner Installed (OFOI) communications equipment required for early building services activation. The Work includes, but is not limited to, the following:
 - a. Install all finishes and products specified for the MDF and IDF rooms and provide complete mechanical and electrical services for the rooms.
 - b. Install doors and locks and provide three (3) sets of keys to the Owner.
 - c. All necessary Contractor Furnished Contractor Installed (CFCI) conduit pathways between the MDF and IDF rooms shall be installed and CFCI room cable required for the early service outlet locations shall be terminated and tested and the test results provided to the Owner.
 - d. The entire room and all components shall be entirely HEPA vacuumed. NO DUSTING OR SWEEPING IS ALLOWED. The rooms must be dust-free and maintained by Contractor dust-free until Substantial Completion.
- C. Mechanical and Electrical Coordination:
1. Resolve all tight or restricted conditions involving work of various sections in advance of installation.
 2. Coordinate the Work of all sections to ensure that all fixtures, devices, switches, outlets, ducts, pipes, and similar items can be installed as shown.
- D. Job Site Field Measurements and Templates:
1. Obtain field measurements required for accurate fabrication and installation of work included in the Contract Documents. Exact measurements are the Contractor's responsibility.
 2. Furnish or obtain templates, patterns, and setting instructions as required for installation of all work. Verify in field.

PART 2- PRODUCTS (Not Used)

PART 3- EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for meetings during construction in addition to requirements specified elsewhere in the Contract Documents.
- B. Design-Builder (D-B) and Subcontractor representatives attending meetings must be qualified and authorized to act on behalf of their firms.
- C. The Owner will utilize an internet-based construction management system (CMS) for communications and documents controls with the Contractor and A/E on this Project (see Section 01 35 00 "Electronic Communications").
 - 1. Meeting minutes, Contractor construction activity data and work plans, A/E field reports and other such communications shall be distributed electronically by e-mail.
- D. Related Sections:
 - 1. Section 01 32 16 "Construction Progress Schedule"

1.2 PRECONSTRUCTION MEETING

- A. The Owner will schedule a preconstruction meeting to be held prior to the Design-Builder mobilizing and beginning any Work. This meeting will review Contract administration requirements and mobilization procedures.
- B. Meeting location: To be determined
- C. Participants shall include:
 - 1. Design-Builder's Project Manager, Superintendent, CQC Representative, Safety and Health Officer, and for projects with LEED requirements, LEED Coordinator;
 - 2. Owner's Representative, Project Manager, and for projects with LEED requirements, the Owner's Sustainability Manager;
 - 3. Design-Builder's sub-consultants, as appropriate;
 - 4. Owner's consultants, as appropriate; and
 - 5. Others, including the Design-Builder's major Subcontractors as appropriate.
- D. Owner's Representative will: Administer the meeting
- E. Design-Builder will: Record and distribute copies of the minutes within seven (7) days of the meeting to all meeting participants.
- F. Agenda:
 - 1. The Work including, but not limited to:
 - a. Schedule and phasing requirements
 - b. Design-Builder's use of premises
 - c. Special conditions and coordination
 - 2. Communications including, but not limited to:
 - a. Chain and persons authorized to direct changes
 - b. Field decisions, and clarifications
 - c. Hazard communication
 - d. Project meetings
 - 3. Design-Builder's "Site Specific Safety Plan"
 - 4. Administrative and procedural requirements including, but not limited to:
 - a. Contract modification

- b. Progress payment
 - c. Submittals - including Design-Builder's Progress Schedule
 - d. Electronic communications
 5. Project LEED requirements and documentation, if any
 6. Testing and inspection.
 7. University Shut-down requests.
 8. Contractor quality control
 9. Temporary facilities and controls including, but not limited to:
 - a. Deliveries and storage
 - b. Temporary utilities and enclosures
 - c. Security procedures
 - d. Noise and vibration control
 - e. Cutting, patching, and field engineering
 - f. Utility shutdowns
 - g. Contractor parking
 - h. Housekeeping and waste management
 - i. Infection control - for medical facilities projects
 10. Closeout procedures - including Project Record requirements
 11. Other information as appropriate
- G. Design-Builder shall conduct a like meeting, covering the same body of information, with each Subcontractor's project manager and foreman supervising the Work prior to the performance of any work on-site by that Subcontractor.
1. Provide Owner copies of meeting minutes prepared by the Design-Builder with each Subcontractor, when requested by Owner.

1.3 CONSTRUCTION PROGRESS MEETINGS

- A. Progress meetings shall occur weekly until Substantial Completion has been achieved.
- B. Meeting location: To be determined
- C. Participants shall include:
 1. Design-Builder's Project Manager, Superintendent, CQC Representative, and Safety and Health Officer as appropriate;
 2. Owner's Representative and Project Manager;
 3. Design-Builder's sub-consultants, as appropriate; and
 4. Others, including the Owner's consultants, as appropriate.
- D. Owner's Representative will: Administer the meeting
- E. Design-Builder shall: Provide schedules, logs and other construction activity data to support the issues discussed at the meeting.
- F. Design-Builder will: Record and distribute copies of the minutes prior to the next progress meeting to all meeting participants and provide copies at each meeting.
- G. Agenda:
 1. Review and approve the minutes of the previous meeting noting exceptions, if any
 2. Review the progress of the Work since the previous meeting
 3. Review the Short Interval Schedule and work plans for progress during the period
 - a. Identify pending meetings
 - b. Discuss safety activities and job hazards analysis
 4. Discuss field observations, problems, and conflicts

- a. Identify problems impeding the construction Progress Schedule
5. Review Quality Control
 - a. Non-Conformance Reports - discuss corrective Work actions
 - b. Infection control – for medical center projects
6. Review the Submittal Schedule and RFIs - present methods to expedite as required
7. Review off-site fabrication and delivery schedules
8. Review proposed changes in the Work and substitution requests for:
 - a. Timely processing
 - b. Effect on the Progress Schedule and Substantial Completion
 - c. Effect on any other contracts of the Project
9. Review any other business

1.4 PRE-INSTALLATION MEETINGS

- A. Pre-installation meetings shall be held prior to the Design-Builder or Subcontractors beginning work on each definable feature of the Work identified in the Contract Documents to require a pre-installation meeting and/or as required by the Owner's Representative. Notify Owner's Representative at least ten (10) working days in advance of each pre-installation meeting.
 1. At the Owner's discretion, the Owner may conduct this meeting as part of the Construction Progress Meeting.
- B. Meeting examples include, but not by way of limitation:
 1. Site clearing and excavation
 2. Demolition and regulated materials remediation
 3. Site utilities
 4. Landscaping and site restoration
 5. Concrete
 6. Masonry
 7. Structural steel
 8. Exterior cladding systems
 9. Water and damp proofing and roofing
 10. Doors, including frames and hardware
 11. Millwork
 12. Finishes
 13. Equipment, including elevators
 14. Mechanical and Electrical systems, such as high voltage, fire alarm, and communications
 15. Specialty items
- C. Meeting location: To be determined
- D. Participants shall include:
 1. Design-Builder's Superintendent, CQC Representative, and Safety and Health Officer as appropriate;
 2. Subcontractor's project manager or foreman supervising the Work, as appropriate;
 3. Owner's Representative;
 4. Design-Builder's sub- consultants, as appropriate;
 5. Owner's consultants as appropriate; and
 6. Others as appropriate.
- E. Agenda:
 1. Review of the pre-installation CQC Work Plan and Contract requirements
 2. Materials - available and ready for use
 3. Submittals
 4. Persons responsible for performing the work
 5. Tests - required tests, criteria for performance, who samples and how often

6. Safety procedures and requirements
7. Substrate - criteria for substrate
8. Other items as appropriate

- F. Design-Builder shall: Administer the meeting, and record and distribute copies of the minutes within seven (7) days of each meeting to all meeting participants.

1.5 CHANGE ORDER MEETINGS

- A. Change order meetings shall be held to review and resolve any Change Order Proposals, change order requests, or other change order issues pertaining to Contract Modification. Meetings shall be held monthly until all Change Order Proposals are resolved.
1. At the Owner's discretion, the Owner may conduct this meeting as part of the Construction Progress Meeting.
- B. Meeting Location: To be determined
- C. Participants shall include:
1. Design-Builder's Project Manager, or cost engineer as appropriate;
 2. Owner's Representative;
 3. Design-Builder's sub-consultants, as appropriate;
 4. Others, including the Owner's consultants as appropriate.
- D. Owner's Representative will: Administer the meeting
- E. Agenda: Review Change Order Proposals for scope and estimated costs, and negotiate Change Order Proposal prices.

1.6 DRAFT APPLICATION FOR PAYMENT REVIEW MEETINGS

- A. Draft Application for Payment review meetings shall occur monthly.
1. At the Owner's discretion, the Owner may conduct this meeting as part of the Construction Progress Meeting.
- B. Meeting location: To be determined
- C. Participants shall include:
1. Design-Builder's Project Manager;
 2. Owner's Representative;
 3. A/E and A/E's sub-consultants, as appropriate; and
 4. Owner's consultants as appropriate.
- D. Owner's Representative will: Administer the meeting
- E. Design-Builder shall: Present the draft monthly Application for Payment together with the required back up information for review and comment by the Owner and A/E.
- F. Agenda - Discussion will pertain to items such as:
1. Percentage of work complete
 2. Off-site storage
 3. Bill of quantities
 4. Percentage of subcontract payment allocations
 5. Apprentice Utilization and Journey Level Report

1.7 SPECIAL MEETINGS

- A. Special meetings may be called at the discretion of the Owner or Design-Builder for the purpose of coordinating specific information or resolving special issues related to the Project.
- B. Contractor shall record and distribute minutes within three (3) days of the meeting to all meeting participants.

1.8 COMMISSIONING MEETINGS DURING CONSTRUCTION

- A. Commissioning meetings shall occur weekly during the start-up and commissioning phase of the Work.
 - 1. At the Owner's discretion, the Owner may conduct this meeting as part of the Construction Progress Meeting.
- B. Meeting location: To be determined
- C. Participants shall include:
 - 1. Design-Builder's Test Engineer, and Superintendent as appropriate;
 - 2. Subcontractor's representative(s) as appropriate;
 - 3. Owner's Representative;
 - 4. Owner's Commissioning Authority; and
 - 5. Design-Builder's sub-consultants, as appropriate.
- D. Commissioning Authority will: Administer the meeting
- E. Design-Builder shall: Record and distribute copies of the minutes prior to the next meeting to all participants and provide copies at each meeting.
- F. Agenda - Discussion will pertain to items such as:
 - 1. Coordination of Work of applicable trades, such as balancing, electrical, controls, communications wiring connectivity;
 - 2. Scheduling of systems shutdown and switch over;
 - 3. Start-up and functional performance tests acceptance criteria; and
 - 4. Code and ordinance inspections/approvals.

1.9 LEED MEETINGS

- A. LEED meetings shall occur monthly until Final Completion is achieved or until LEED documentation is complete, submitted on-line to the Green Building Certification Institute (GBCI), and is acceptable to the Owner, whichever occurs first.
- B. Meeting location: To be determined.
- C. Participants shall include:
 - 1. Design-Builder's LEED Coordinator and Project Manager, as appropriate.
 - 2. Owner's Sustainability Manager and Owner's Representative, as appropriate.
 - 3. Design-Builder's sub-consultants, as appropriate.
- D. Design-Builder shall: Administer the meeting and record and distribute copies of the minutes prior to the next meeting to all participants and provide copies at each meeting.
- E. Agenda - Design-Builder shall review:
 - 1. The Design-Builder and Owner shall review the LEED Site and Field Binder documentation for completeness and accuracy.

2. LEED construction procedures and management plans, and the preparation of GBCI on-line forms.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

CONSTRUCTION PROGRESS SCHEDULE**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements, in addition to those defined in the General Conditions, for Baseline Progress Schedule preparation, monthly Progress Schedule updates, change in Contract Time analysis, submittal schedules, and short interval schedules.
- B. Related Sections:
 - 1. 01 26 00, "Contract Modification Procedures"
 - 2. 01 29 76, "Progress Payment Procedures"
 - 3. 01 50 00, "Temporary Facilities and Controls"
 - 4. 01 77 00, "Closeout Procedures"
- C. Owner's forms included by reference for this Section include (see Appendix A):
 - 1. Short Interval Schedule
- D. Total Float is defined as the amount of time between the earliest start date and the latest start date, or between the earliest finish date and the latest finish date of an activity on the Progress Schedule. Float is not for the exclusive use of either the Design-Builder or the Owner unless otherwise identified in the Contract Documents.
 - 1. Extensions of time for Contract performance will be granted only to the extent that equitable time adjustments to the affected activity or activities exceed the total float time along the affected paths of the current Progress Schedule at the time a Field Order, or Change Order, was issued for the change.
- E. All Progress Schedule submittals, including monthly Progress Schedule updates, will be reviewed jointly by the Owner's Representative and the Design-Builder. Such review of the Contractor's schedules shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing, or its ability to complete the Work in a timely manner.
- F. As used in this Section, "Progress Schedule" refers collectively to "Baseline Progress Schedule" and "monthly Progress Schedule updates."

1.2 PROGRESS SCHEDULE

- A. Within fourteen (14) calendar days after Notice-to-Proceed, the Contractor shall prepare and submit to the Owner, for review and comment, one (1) electronic copy of a preliminary Progress Schedule utilizing a Critical Path Method (CPM) logic based on the Contract Documents. The Owner will review the preliminary schedule for conformance with the Contract Documents and provide comments within fourteen (14) calendar days of receipt from the Contractor. The Contractor shall respond to all comments and provide the Owner a Baseline Progress Schedule within fourteen (14) calendar days of receipt of the Owner's comments.
- B. Once the Baseline Progress Schedule is submitted to the Owner, the Progress Schedule shall be formally established as the baseline file within the Contractor's scheduling software. This baseline file shall not be modified without the Owner's written approval.
 - 1. The amount specified in Section 01 29 76 shall be withheld from the Design-Builder monthly Application for Payment if the Baseline Progress Schedule and Submittal Schedule, referenced in 1.5 of this Section, are past due and such amount may, at the

CONSTRUCTION PROGRESS SCHEDULE

Owner's sole judgment and discretion, be reduced from the Contract Sum by unilateral Change Order (see Section 01 29 76, "Progress Payment Procedures").

- C. The Baseline Progress Schedule shall be the basis that the Design-Builder shall use to: plan, organize, and execute the Work; record and report actual performance and progress through updates, and; show how the Contractor plans to complete all remaining Work. The Baseline Progress Schedule and monthly Progress Schedule updates shall be the basis for consideration and analysis of requests for time extensions as specified below. The schedule shall be in the form of an activity based precedence diagram.
- D. The Baseline Progress Schedule and monthly Progress Schedule updates shall be constructed to show the order in which the Contractor proposes to carry out the Work, and to indicate the restrictions of access to and availability of the work area, and availability and use of manpower, materials, equipment, and all activities of trade contractors, equipment vendors, and suppliers. The Progress Schedule shall incorporate contractually specified limitations and restrictions, and contractually specified milestones. Construction activities shall match or be correlated with the pay items in the approved Schedule of Values. The Progress Schedule shall be prepared in sufficient detail with the assignment and coding of all activities by the Contractor and Subcontractors in consideration of, but not limited to, the following Work activities:
 - 1. Access and availability to the Project Site, including road closures;
 - 2. Identification of interfaces and dependencies with preceding, concurrent, and succeeding contractors, if applicable;
 - 3. The type of work to be performed and labor trades involved;
 - 4. All procurement, manufacturing, fabrication (both on-site and off-site), and delivery activities for all major materials and equipment;
 - 5. Shutdowns of existing Owner's equipment and utility services;
 - 6. Required delivery dates of OFCI equipment and materials;
 - 7. Testing, air balancing, and commissioning activities, including submission and approval of test results;
 - 8. Approvals by regulatory agencies or other third parties, including obtaining an Occupancy Permit;
 - 9. Coordination for Owner's occupancy including Owner's cleaning, OFOI equipment and furnishings installations;
 - 10. Planning for phased occupancy by the Owner, with intermediate completion dates;
 - 11. Contractor's preliminary cleaning and final cleaning operations;
 - 12. Contractor's Final Punch List Report, Owner's Final Inspection (Punch List), Contractor's corrections, and Owner's re-inspection;
 - 13. Substantial Completion and Final Completion activities and milestones, and Final Acceptance.
- E. The activities defined in the Progress Schedule shall represent the planned durations in anticipation of normal man-power and equipment utilization in durations of whole working days. No activity durations shall exceed twenty two (22) working days. If approved by the Owner, longer durations may be allowed for non-construction activities such as procurement, delivery, or submittal activities. All durations shall be determined based upon resource planning under contractually defined on-site work conditions. In calculating activity durations, normal inclement weather shall be considered. The Contractor shall schedule the Work to minimize the effect of adverse weather. The Contractor shall also protect the work site from the effects of adverse weather or take other necessary measures such that the Work can be completed within the time established in the Contract Documents and include these provisions in the schedule as appropriate.
- F. Schedule activity identification codes shall not be alphanumeric unless approved by Owner.

CONSTRUCTION PROGRESS SCHEDULE

1. Activity Description: Provide adequate information to readily identify each activity up to 48 characters in the general descriptive format: action, item, location (such as Install Steel Studs 3rd Floor).
 2. The Critical Path shall be clearly indicated on all diagrams submitted. An activity is critical when it is part of the longest duration pathway(s) through the CPM network or when total float is less than or equal to zero.
 3. Clearly identify activities that are planned to use overtime, double shifts, work on weekdays or holidays.
 4. Include a listing of activities with open ends and out-of-sequence progress.
- G. Certification: When requested by Owner, submit certification that each Subcontractor and major equipment supplier has participated in, reviewed, and concurs with the Progress Schedule as it relates to their Work.

1.3 MONTHLY PROGRESS SCHEDULE UPDATES

- A. The Design-Builder is required to prepare and submit monthly Progress Schedule updates and to participate in monthly schedule update meetings with the Owner as described below.
1. Timely submission of updates is of significant and crucial importance to the management of this Project. Lack of, or late receipt of, updates diminishes their value to the Owner. If a monthly Progress Schedule update is not submitted to and reviewed with the Owner prior to the Contractor submitting its monthly Application for Payment, the monthly Schedule of Values amount for Progress Schedule updates may, at the Owner's sole judgment and discretion, be reduced from the Contract Sum by unilateral Change Order (see Section 01 29 76, "Progress Payment Procedures").
- B. The Design-Builder shall prepare a monthly Progress Schedule update to reflect work progress achieved since the previous update. Historical performance data and/or records shall not be changed without the approval of the Owner.
- C. The Design-Builder shall use and maintain a fixed end date when generating the required reports and diagrams for the Owner as specified by this Section. The fixed end date shall be the Substantial Completion date. The fixed end date will be adjusted in subsequent updates only to reflect approved time extensions incorporated by Change Order.
- D. The Project shall be rescheduled each reporting period with:
1. An updated data date.
 2. Actual start/finish dates.
 3. Percent complete.
 4. Remaining durations (for each activity) in the "status" or "current" file.
- E. Show changes occurring since the previous schedule submission, such as:
1. Any major changes in scope.
 2. Activities modified since previous submission including, but not limited to, logic changes.
 3. Revised projections for progress and completion, as applicable.
 4. Any other identifiable changes.
- F. The Design-Builder shall account for all rain days, for major events, and similar excusable non-compensable delays, during which little or no work is progressed and that are acknowledged by the Owner, in the period within which the events occur.
- G. The Construction Progress Meeting shall be held prior to Owner's review and comment of the Design-Builder's draft Application for Payment, unless otherwise approved by Owner.
1. The Design-Builder shall provide copies of two tabular reports:

CONSTRUCTION PROGRESS SCHEDULE

- a. A total float report clearly indicating the current critical path through Substantial Completion.
- b. A report of activities sorted by early start dates commencing with the previous monthly progress update and including all updated activities during the previous month. Actual progress of the previous month will be recorded and incorporated into the update.
2. The Design-Builder shall provide copies of a narrative report to include:
 - a. A description of the Work that has progressed.
 - b. An explanation of the Work that had been scheduled to be performed in the previous period but was not performed, and why it was not performed.
 - c. Anticipated delay and impact on the schedule.
 - d. Corrective action recommended and its effect.
 - e. A discussion of the Work scheduled for the upcoming period noting any issues or events that could impact this Work.
 - f. If the Contractor intends to make a logic or original activity duration change(s), the report shall include such changes.
3. The Design-Builder and Owner shall review these reports and discuss any differences or issues raised.

1.4 CHANGE IN CONTRACT TIME ANALYSIS

- A. It is the Owner's desire and intent to resolve all issues affecting the Substantial Completion date in a timely, efficient, and effective manner. To achieve this goal, the Owner and Design-Builder shall participate in an analysis of all delays and advances of the schedule.
- B. Assessment of impacts due to changes or other events must be performed on the most recent update of the Progress Schedule. Further impacts due to changes or other events shall be assessed utilizing the Progress Schedule update that represents the data date closest to, and just prior to, the date of the impacting event.
- C. The logic and planning elements of the Progress Schedule are the Design-Builder's responsibility.
 1. No Contract Time shall be modified unless directed by an approved Change Order.
- D. Submission of a valid monthly Progress Schedule update and the completion of a delay analysis impacting the critical path are conditions precedent to the review and approval of any request for an extension in the Contract Time. Failure to complete monthly Progress Schedule updates and to participate in the analysis will defer consideration of any time extensions by the Owner until the Work is completed and all as-built progress can be analyzed by the Owner. Further, the Owner will assess liquidated damages, if any, regardless of the status of any requests for time extensions pending, until any such requests are resolved.

1.5 SUBMITTAL SCHEDULE

- A. General: Within ten (10) calendar days following Owner's receipt of the Baseline Progress Schedule, the Contractor shall prepare and submit to the Owner a complete schedule of work-related submittals based on the Progress Schedule, as required by the Contract Documents ("Submittal Schedule"). Correlate Submittal Schedule with the listing of principal Subcontractors.
- B. Form: Prepare Submittal Schedule in chronological sequence of submittals. Show category of submittal, name of Subcontractor, generic description of work covered, related Specification Section numbers, activity or event code on the Progress Schedule baseline file, scheduled date for first submission, and blank columns for actual date of submittal, re-submittal, and final

CONSTRUCTION PROGRESS SCHEDULE

release or acceptance by the A/E. The Submittal Schedule shall be prepared in sufficient detail and in consideration of, but not limited to, the following:

1. Preparation and submission of shop drawings, layout drawings, product data, material samples, and mock-ups.

- C. Update the Submittal Schedule monthly and submit to Owner.

1.6 SHORT INTERVAL SCHEDULE

- A. Short Interval Schedule: Prepare and update weekly a four (4) week Short Interval Schedule. Show previous week of actual progress (planned vs. actual performance). Forecast three (3) weeks of start and completion dates for each activity, task, or event in comparison to the Design-Builder's Construction Progress Schedule.

1. Activities in the Short Interval Schedule shall relate directly to activities in the Progress Schedule.

- B. Format for the Short Interval Schedule should be similar to the Owner's form. The Design-Builder may submit an alternative format that must first be approved by the Owner. The format shall include comment annotation as necessary.

- C. Copies of the Short Interval Schedule shall be provided at the Construction Progress Meetings and will be used as the basis for discussion of progress and planned work at the meetings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies general administrative and procedural requirements for submittals required by the Contract Documents.
- B. Related Sections
 - 1. Section 01 33 00.11 – Submittal Standards Requirements and Compliance Review Exhibit
 - 2. Section 01 78 23.11 – Facilities Management Data Requirements for Operations and Maintenance .

1.2 SUBMITTAL PROCEDURES

- A. The Owner intends to utilize an internet-based construction management system (CMS) for submittals (see Section 01 35 00 “Electronic Communications”).
 - 1. The electronic submittal process is not intended to be used for color samples, color charts, or material samples.
- B. Coordination: Contractor shall review submittals for completeness, accuracy, and compliance with the development of design, and shall coordinate the transmittal of submittals to ensure there is no delay in the project Progress Schedule. Submittal sequencing should coincide with the Contractor’s Submittal Schedule.
 - 1. Allow ten (10) calendar days turnaround for each submittal, from time of receipt by the Owner. For complex submittals or submittals requiring coordination with subsequent submittals, plan additional turnaround time.
 - a. Provide a "Priority List" when submitting several submittals within a short time.
 - 2. Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - 3. Submittals received from sources other than Contractor will be returned without action.
- C. Submittal Preparation: Contractor shall place a label on each submittal for processing. Include the following information on the label:
 - 1. Date
 - 2. Owner’s Project name
 - 3. Name of Contractor and submittal number
 - 4. Name of the entity that prepared the submittal
 - 5. For Shop Drawing submittals, Design-Builder’s certification that the submittal has been coordinated and reviewed for compliance with the requirements of the Contract Documents, and is approved for Owner’s review and action.
- D. Submittal Transmittal: Design-Builder shall include a transmittal with each submittal package.

SUBMITTAL PROCEDURES

1. Address no more than one topic, or related topics, on a single transmittal (i.e., mechanical items shall not be submitted with electrical items; miscellaneous specialties shall not be grouped; shoring shall be submitted separate from foundations).
 2. Record relevant information including, but not limited to: the requested review return date (in order to maintain the construction Progress Schedule) and, for Shop Drawings, variations from the requirements of the Contract Documents.
 3. Provide the minimum number of each required submittal as noted in the Contract Documents and/or as follows:
 - a. Shop Drawings: one (1) PDF
 - b. Product data: one (1) PDF
 - c. Samples: five (5) samples
 - d. Mock-ups: As determined by the Owner and Design Builder
 4. Material and Color Samples: Submit samples of actual materials and colors.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in the material, submit no less than four (4) variations of each sample to show approximate limits of the variations.
- E. Portable Document Format (PDF) Requirements:
1. Refer to Section 01 33 00.11 – “Submittal Standards Requirements and Compliance Review Exhibit” for requirements relating to electronic files used for submittals.
 2. Electronic Re-Submittal Formatting Requirements: When the Contractor is required to re-submit a Product Data submittal in an electronic file format, the Contractor shall resubmit only the updated portions of the submittal in order to aid the A/E and Owner in the review process. The Contractor shall also maintain a conformed version of the submittal that is modified as the re-submitted portions are reviewed. The Contractor shall edit the final, conformed submittal to include all modifications and corrections made during the review process into a single document. It shall not be acceptable to provide the original submittal with revisions attached. This final, conformed submittal document is intended to be included in the eO&M. Refer to Section 01 78 23 – Operation and Maintenance Data.
- F. Owner's Action: Except for submittals provided for the Owner's information, the Owner will: review the submittal and provide notation as follows on the submittal
1. Accepted without exception;
 2. Subject to noted corrections;
 3. Returned for re-submittal after correction; and
 4. Rejected as non-compliant with the Contract Documents.
- G. Compliance with Contract Documents requirements is the Contractor's responsibility.
1. Owner's approval of submittals does not relieve the Contractor from responsibility for a proper installation, compliance with applicable codes, or coordination of the Work.
 2. All submittals required by the project team as established in preliminary design will be reviewed by the Owner for CAD drafting compliance, PDF compliance, and to determine completeness of the documents provided.

1.3 SHOP DRAWINGS

- A. General: Shop Drawing submittals include, but are not limited to, product data, samples and mock-ups, and layout drawings.
 - 1. For CAD Shop Drawing submittals, see Section 01 77 00 "Closeout Procedures."
 - 2. The actual cost of each shop drawing submittal shall be included in the subcontract bid packages.
- B. Product Data: Product data includes manufacturer's printed installation instructions, catalog cuts, standard color charts, rough-in diagrams and templates, standard wiring diagrams, and performance curves.
 - 1. Submit specially prepared manufacture's product data when standard product data is insufficient.
 - 2. Mark each product data submittal and show the following information:
 - a. Compliance with specified product requirements,
 - b. Compliance with any specified industry standards and testing agency standards, with testing agency labels and seals
 - c. Manufacturer's printed recommendations
 - d. Applicable choices and options
 - e. Notation of coordination requirements
 - f. Notation of dimensions established by field measurement, as appropriate
- C. Samples and Mock-ups: Samples include, but are not limited to, actual colors, materials and products to be provided. Mock-ups include field installations and partial assemblies of components.
 - 1. Prepare samples to facilitate review. Provide the following information:
 - a. Generic description of the sample
 - b. Source of the sample
 - c. Confirmation of availability and delivery time
 - 2. Where samples are for selection of appearance characteristics from a range of standard choices, submit a full set of choices for the material or products.
 - 3. Maintain sets of approved samples and mock-ups at the Project site for quality comparisons throughout the course of construction.
- D. Layout Drawings: Drawings include, but are not limited to, fabrication and installation drawings, layouts, schematics, diagrams, schedules, patterns, and templates.
 - 1. Submit drawings drawn to accurate scale. Indicate, at a minimum, the following information:
 - a. Dimensions
 - b. Identification of products and materials included
 - c. Compliance with product installation requirements and/or industry standards

- d. Notation of coordination requirements
- e. Notation of dimensions established by field measurement

E. Not Used.

- F. Ceiling Layout Drawings: Contractor shall submit for Owner's review detailed reflected ceiling layout drawings at a scale not less than 1/8" = 1'-0" showing gypsum wallboard soffits and headers with heights, and locations of access doors, roof openings, HVAC diffusers, sprinkler heads, fire alarm devices, lights, and other ceiling mounted appurtenances.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

**SUBMITTAL STANDARDS REQUIREMENTS
AND COMPLIANCE REVIEW EXHIBIT****PART 1 - GENERAL****1.1 SUMMARY****A. Description:**

1. This Section specifies the standards for digital/electronic data files submitted by the Contractor relating to Operation and Maintenance (O&M) documentation, As-Built drawings, and CAD/BIM files. The Contractor shall adhere to these standards for those submissions.

B. Related Sections:

1. Section 01 33 00 – Submittal Requirements
2. Section 01 77 00 – Closeout Procedures
3. Section 01 78 23 – Operation and Maintenance Data

1.2 PORTABLE DOCUMENT FORMAT (.PDF) ELECTRONIC FILE REQUIREMENTS

- A. All portable document format electronic files shall be created as “.pdf” files from the original source files, unless otherwise approved in writing by the Owner.
- B. When creating “.pdf” files from CAD software, the Autodesk “DWG to PDF.pc3” print configuration shall be used.
- C. Documents shall be created with a resolution of not less than 300 dpi.
- D. All fonts shall be embedded in the electronic file.
- E. The “.pdf” file page sizes shall be the same as the original document page sizes if the document were printed (e.g., an original document with a page size of 24”x36” shall be created with in “.pdf” format with a page size of 24”x36”.
- F. Each document shall be submitted as a single electronic file.
- G. The documents shall not be submitted using file compression software.
- H. The Contractor shall submit “.pdf” files in a format that allows them to be searchable for text strings. Where these files are not provided with searchable formatting, the Contractor shall utilize OCR (optical character recognition) software to convert the files into a searchable format.
- I. When “.pdf” documents contain content that is divided into a Table of Contents or similar major document divisions, the Contractor shall create electronic “bookmarks” for each major document section to allow the reader to navigate through the electronic file more efficiently. The Contractor shall also create electronic bookmarks for Product Data submittals to allow efficient navigation to sections of that document that contain multiple unique products and product types.

1.3 CAD ELECTRONIC FILE REQUIREMENTS

- A. Computer Aided Design (CAD) electronic files shall be submitted in AutoCad ® “.dwg” format.

**SUBMITTAL STANDARDS REQUIREMENTS
AND COMPLIANCE REVIEW EXHIBIT**

Page 2 of 3

- B. Building Information Model (BIM) electronic files shall be submitted in AutoCad ® Revit © format, in a mutually agreed upon release version.
- C. Custom menus or “.arcx” applications shall not be allowed if it creates a requirement for the drawing to be used. No menus, custom user interface (CUI) or arx applications are allowed.
- D. Each CAD drawing file shall represent a single printed sheet and the file name shall conspicuously identify the sheet number.
- E. Organize the submittal such that the files for each discipline are arranged in a separate subfolder, clearly labeled to identify the discipline. All supporting files (font file, line types, hatch types, plot configurations, plot style tables, etc.) shall be in a subfolder.

1.4 CAD STANDARDS**A. Title Blocks:**

- 1. All sheets shall have a title block on the right hand side of the drawing.
- 2. Title blocks shall include the following information:
 - a. Date,
 - b. University project number,
 - c. University facility number (FACNUM),
 - d. Project name,
 - e. Sheet name,
 - f. Sheet number,
 - g. Key plan (for floor plans),
 - h. List of revisions and corresponding dates,
 - i. Name of design firm that produced the drawing,
 - j. Architect/engineers stamp.

B. Layering standards:

- 1. The CAD layering standards shall be in compliance with the Army Corps of Engineers A/E/C CAD standard format. The standard can be found at the following web page:

<https://cadbim.usace.army.mil/CAD>

C. Scaling and Units:

- 1. All drawings shall have a unit measure assigned and not set to “unit-less”.
- 2. All objects shall be drawn at true scale (1 to 1) for the assigned units of measurement within the model space.
- 3. No external references shall be allowed. All external references shall be “bound” to the drawing file such that it is part of the file.
- 4. CAD drawings shall indicate the boundary area of all work for the project.
- 5. The start date of the warranty,

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for electronic communications and document control between the Owner and Design-Builder in supporting the Work of the Contract Documents.
- B. The Owner will provide the Design-Builder and its Subcontractors access to the Owner's internet-based integrated construction management system (CMS) which shall be used for communications and document control.
 - 1. Not all Project documents are tracked in the CMS. For most documents not in the system, the Owner provides electronic forms created with other industry standard software.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. System Access: The Owner will provide the required access codes necessary for the Design Builder's access to the Owner's CMS website. The Owner will host the software and administer authority levels and classifications to users to control security access. Access levels will be provided to match only the level necessary to maintain and process electronic documents specified in this Section.
 - 1. Owner shall not be responsible for temporary or intermittent outages.
- B. System Users: The Design-Builder shall provide a list of all parties that will be given access to the system. The Owner will provide the Design-Builder with access for a maximum of eight (8) users, unless otherwise requested by the Design-Builder and approved by the Owner. The Design-Builder may, at its sole discretion, elect to enter all required data into the system including input from Subcontractors or may require the Subcontractors to enter their own data, but in either case the Design-Builder will be responsible for the accuracy of the data entered.
- C. System Training: The Owner will provide initial training in the use of the CMS website at no cost to the Design-Builder commensurate with requirements for document control specified in this Section.
 - 1. The Owner will provide a training seminar for up to eight (8) representatives from the Design Builder's organization at no cost to the Design Builder. A training location and dates for the training will be provided after the award of the Contract. Training is anticipated to begin within two weeks of Contract execution.
 - 2. Additional training requested by the Design-Builder shall be subject to approval by the Owner.
- D. Documents Requiring Signatures: All documents requiring signatures for approval shall be processed with the CMS to expedite preliminary concurrence of information only. Receipt of a "hard copy" signature on forms is required prior to implementing action or work as the conditions may require.
- E. Equipment and Software Requirements: A computer with high speed internet access will be required in the Design Builder's home office and field office and in the offices of each of its Subcontractors using the CMS. Each computer must utilize Internet Explorer 8 or above and must be equipped to handle current versions of Microsoft Excel and Word documents, as well as .pdf and .tif files.

- F. Information Input: The responsibility of the Owner, A/E, and Design-Builder to enter information and data into the Owner's internet-based CMS shall correlate with the responsibilities of the same parties as specified in all other sections within these Contract Documents. Responsibilities include, but are not limited to:
1. The Owner will input Project and cost information from the Contract Award and maintain emergency contact lists, reports, logs, and enter all change documents.
 2. The A/E will enter the Contract Documents and design clarifications with attached drawings and details, after Owner's approval, and field reports.
 3. The Design-Builder will enter all meeting minutes, submittals, utility shutdown requests, Requests for Information and other reports and documents required by the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

A. This Section specifies minimum requirements for safety on the construction site including:

1. Design-Builder responsibility (regarding safety)
2. Design-Builder safety program and plan submittals
3. Design-Builder safety requirements
4. Design-Builder safety reporting
5. Construction "fire safety" requirements
6. Chemical hazard communication
7. Chemicals of interest reporting

B. Owner's forms referenced in this Section include (see Appendix A):

1. Chemicals of Interest – Contractor (Design-Builder) Declaration and Reporting Form

1.2 DESIGN-BUILDER RESPONSIBILITY

A. The Design-Builder is solely and completely responsible for compliance with all applicable laws, codes and regulations regarding safety (whether noted in this Section or not) and for creating and maintaining a safe working environment, including safety of all persons and property on the jobsite (whether the requirements of this Section address a particular situation or not).

B. The Design-Builder shall maintain the jobsite and perform the Work in a manner which meets or exceeds statutory and regulatory requirements for the provision of a safe place to work and which minimizes safety risks to personnel of the Design-Builder, Subcontractors, Owner, general public or other parties. This obligation shall apply continuously and not be limited to normal working hours.

1. The Design-Builder shall ensure that all Design-Builder and Subcontractor personnel are provided sufficient training, and shall take such actions as are necessary to maintain a safe environment on the construction site. Such training and actions shall include, but not be limited to, ensuring that such employees are familiar with governing construction safety requirements and the requirements for compliance with applicable regulations.
2. The Design-Builder shall monitor the jobsite to ensure that employees do not create unsafe conditions for others, and to comply with the provisions of the Site Specific Safety Plan.
3. The Design-Builder shall establish and communicate clear expectations to its employees and Subcontractors of any tier (and their employees) of their obligation to notify the Design-Builder and any at risk party of any potential health or safety hazard affecting themselves or others.
4. The Design-Builder shall conduct on-site safety meetings weekly, or other frequency as appropriate, that shall be mandatory for all employees.

C. The Design-Builder shall designate a full-time on-site competent individual to be the "Safety and Health Officer" who is qualified and authorized to supervise and enforce compliance with the Design-Builder's Site Specific Safety Plan during the performance of the Work. The

OWNER SAFETY REQUIREMENTS

Design-Builder is responsible to ensure that all necessary monitoring equipment, protective clothing, and other supplies and equipment are available to implement the Plan.

1. The Design-Builder shall require each Subcontractor to provide a safety manager (competent individual) for the duration of work at the Project site. If the man-load is below fifty (50) field workers, the Subcontractor may designate its Superintendent as the safety manager. If the man-load is fifty (50) or above field workers on-site, the Subcontractor shall provide and designate a dedicated competent individual as safety manager whose sole responsibility is Project safety including, but not limited to: review pre-task plans, critical lift plans, rigging and installation means and methods, fall protection, trenching excavations, electrical safety, Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act of 1973 (WISHA) regulations compliance, and second tier Subcontractor safety monitoring and compliance.
- D. Safety Violations: In the event of WISHA violations by the Design-Builder or any of its suppliers or Subcontractors of any tier for unsafe practices involving imminent danger to personnel of the Owner, Design-Builder, Subcontractors, or others, the Design-Builder shall immediately correct the hazardous situation which caused the violation prior to any work continuing in the affected area. If such violations exist and corrective actions have not been taken by the Design-Builder, the Owner may order the Design-Builder to stop work (to be followed up in writing the same day), until satisfactory corrective action has been taken.

1.3 DESIGN-BUILDER SAFETY PROGRAM AND PLAN SUBMITTALS

- A. Company Safety Program: The Design-Builder shall submit a copy of its Company Safety Program to the Owner. The Company Safety Program shall contain, at a minimum, the following elements:
 1. Organizational Structure: Include names of individuals who will perform safety duties, titles, work assignments, authority and reporting relationships.
 2. Training Program: Who, how, and when training is provided; method of employee training concerning safety rules and procedures; and training in use of protective equipment.
 3. Protective Equipment: List of personal protective equipment to be provided to employees.
 4. Accident Prevention and Loss Control Plan: Work site inspection and hazard correction procedures; disciplinary procedures for safety infractions; and accident response (investigation and reporting procedures).
- B. Site Specific Safety Plan: The Design-Builder and each of the Design-Builder's Subcontractors shall review the Contract Documents, and the Design-Builder shall develop and submit a copy of a "Site Specific Safety Plan" to the Owner. The Site Specific Safety Plan shall be tailored to the unique issues of the Project and the specific types of hazards likely to be encountered throughout all phases of the Work, be in compliance with WISHA and all other regulatory requirements, and contain, at a minimum, the following elements:
 1. Application of Company Safety Program: The Site Specific Safety Plan shall address how the following elements listed in this Section 1.3B will be specifically applied and modified in addressing the unique issues related to the Project.

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2. Specific Hazards: The Site Specific Safety Plan shall address, as applicable, the following, and other specific hazards for the Project:
 - a. Odor notification
 - b. Excavation and rescue plans
 - c. Pedestrian safety
 - d. Overhead hazards and flying objects
 - e. Hot works
 - f. Hazardous materials and chemical exposure
 - g. Methane abatement
 - h. Safety issues related to Owner's "Prior Occupancy"
 - i. Rigging - aerial lifts and forklifts
 - j. Electrical safety
 - k. Scaffolding and personnel lifts
 - l. Noise and dust
 - m. Lockout/Tagout and control of hazardous energy
 - n. Work in confined spaces
 - o. Housekeeping and safe access
 - p. Silica
 - q. Fall prevention
 - r. Steel erection activities
 - s. Crane safety

1.4 DESIGN-BUILDER SAFETY REQUIREMENTS

- A. Safety Training: Design-Builder shall provide construction site orientation for all employees (including Subcontractor employees) to become familiar with the Site Specific Safety Plan prior to commencing work. Design-Builder shall, on a weekly basis, perform safety training on hazards specific to the phase of work for all employees. These meetings shall be mandatory for all construction employees.
 1. Subjects should include site specific safety issues and procedures and discussion of corrections resulting from any violation in safety procedures. A log of subjects covered and a copy of the attendance records of each meeting shall be submitted to the Owner's Representative on the day the meeting occurs.
- B. Respiratory Equipment: Any personnel performing work requiring the use of respiratory protective equipment shall be fully trained in the use of such equipment. Design-Builder must have a respiratory protection program and ensure that all workers wearing respirators have medical clearance and fit testing, as appropriate, for the type of respirators used.
- C. Personal Protective Equipment: Design-Builder shall ensure all construction personnel are equipped with and utilize personal protective equipment in accordance with Labor and Industries standards. As a minimum requirement, all personnel working on the construction site shall be required to use approved hardhats, safety glasses, appropriate gloves, and substantially constructed work boots. In addition, high-visibility safety apparel shall be worn in accordance with the American National Standards Institute and the International Safety Equipment Association (ANSI/ISEA) standard 107-2004.
- D. First Aid: The Design-Builder shall maintain at the Design-Builder's field office, or other well known place at the Project site, all materials (e.g., a first aid kit) necessary for giving first aid to the injured, and shall establish, publish, and make known to all employees procedures for ensuring immediate removal to a hospital or a doctor's care, persons (including personnel) who may have been injured on the construction site. Construction personnel shall not work on the construction site before the Design-Builder has established, and made known,

OWNER SAFETY REQUIREMENTS

procedures for removal of injured persons to a hospital or a doctor's care. If the Design-Builder and/or any Subcontractors work crew consist of five or more employees, the Design-Builder shall ensure that at least one of such employees has a valid and effective first aid card.

- E. **Safety Walkthrough:** In addition to WISHA requirements, the Design-Builder shall conduct a safety walkthrough of the Project with the Owner's Representative a minimum of once a month during the course of construction. If a safety manager is required for any Subcontractor, the safety manager shall also attend the safety walkthrough. The Design-Builder shall:
 - 1. Document and maintain a written record of the hazards and unsafe practices noted during the walk-through and provide copies to the Owner as requested;
 - 2. Ensure that corrective action is promptly taken to eliminate the items recorded; and
 - 3. Maintain copies of all inspections performed by other competent individuals on the construction site during the course of construction.
- F. **Job Hazards Analysis:** The Design-Builder shall plan daily work, considering procedures with the potential for personnel injury and implement appropriate practices to avoid injuries with focus on engineering controls, personal protective equipment needs, and mitigation for exposure to cuts and lacerations. At each construction progress meeting, the Design-Builder shall present its plan for addressing hazards likely to be encountered in the next week.
 - 1. The Design-Builder shall develop and implement a program requiring task planning at the foreman level, including at the Subcontractor's foreman level.

1.5 DESIGN-BUILDER SAFETY REPORTING

- A. **Reporting Injuries and Incidents:** Design-Builder shall immediately notify the Owner's Representative of any injury or incident to persons, including personnel, on the construction site. Design-Builder shall conduct an immediate investigation with an emphasis on preventative actions and lessons learned. The Design-Builder and its Subcontractor shall document the investigation and submit a hard copy of the report on OSHA Form 301 "Injury and Illness Report," or equivalent, to the Owner within 24 hours of the incident. The Design-Builder shall report on a monthly basis the total number of hours worked on-site by the Design-Builder's employees and Subcontractors, and the total number of recordable incidents and lost time accidents. Design-Builder shall submit copies of the Project First Aid Log to the Owner's Representative on a monthly basis.
- B. **Reporting Potentially Serious Hazards:** Design-Builder shall immediately notify the Owner's Representative of any potentially serious hazard to persons, including personnel, on the construction site. Design-Builder and its Subcontractor shall conduct an immediate investigation and submit a report to the Owner's Representative within 24 hours of becoming aware of the potentially serious hazard. The report shall describe the potentially serious hazard, the results of the Design-Builder's investigation, and any steps the Design-Builder has taken to prevent an injury or incident from occurring based on the potentially serious hazard.
- C. **Emergency Procedures:**
 - 1. For emergencies requiring an ambulance, fire department, or police assistance, the Design-Builder shall call emergency services (fire and police at 911).

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2. Should the Design-Builder find it necessary to call for non-emergency assistance or protection in the exercise of the Design-Builder's responsibilities on the Seattle Campus, the Contractor shall call the University Police Department at 206-543-9331.

1.6 CONSTRUCTION FIRE SAFETY REQUIREMENTS

- A. Fire Safety During Construction and Demolition: The Design-Builder shall conform to Chapter 1, "Fire Safety During Construction and Demolition," of the International Fire Code, as locally amended, and any additional provisions as outlined herein for precautions against fire, flammable and combustible liquids, flammable gases, explosive materials, fire protection, fire reporting, fire fighting access, means of egress, standpipes, fire sprinklers, and roofing operations.
 1. The Design-Builder shall provide adequate separation between Owner-occupied buildings and construction trailers and sheds.
- B. Hot Work Procedures:
 1. Design-Builder shall establish a system for documentation and control of "hot work" activities which include the use of portable gas, grinding, or arc welding equipment and conduct operations in a manner that is fire-safe for the work area and adjacent areas. Hot work permits are to be posted at the jobsite in an accessible and conspicuous location. Maintain the premise clear of rubbish, debris, or other materials constituting a potential fire hazard. The local fire code is incorporated herein by reference; adhere to all applicable provisions as determined by the local fire department. Design-Builder and Subcontractors shall obtain from the local Fire Department engineering inspection section a permit for all hot work activities prior to performing this Work.
 - a. Whenever practical, the Design-Builder shall perform cutting and welding operations off-site.
 2. Maintain copies of all hot work related permits for Owner's review upon request, including, but not limited to:
 - a. Cutting and welding;
 - b. Roofing / hot-tar kettle; and
 - c. Storage of flammable materials (e.g., propane, butane) and/or compressed gases.
 3. Prior to conducting hot work activities, the Design-Builder shall ensure all of the following fire safety precautions have been taken:
 - a. Cutting and/or welding equipment must be thoroughly inspected and found to be in good repair, free of damage or defects.
 - b. A multi-purpose dry chemical, portable fire extinguisher must be located so that it is immediately available to the area of work and is fully charged and ready for use.
 - c. At least one fire alarm pull station or means of contacting the fire department (i.e., site telephone) must be immediately available and accessible to person(s) conducting the cutting/welding operation.
 - d. Floor areas under and at least 35 feet around the cutting/welding operation must be swept clean of combustible and flammable materials.

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- e. All construction equipment fueling activities and fuel storage must be located at least 35 feet away from cutting/welding operations.
- f. Fire resistant shields (e.g., fire retardant plywood, flameproof tarpaulin, metal, etc.), must cover combustible floors.
- g. Combustible materials and finished surfaces, equipment, electrical cables, and personnel must be provided with protection to prevent damage or injury from molten metal, falling sparks, and welding arcs.
- h. Spark / slag catchers (e.g., fire retardant plywood, flameproof tarpaulin, metal, etc.) must be suspended below any elevated cutting/welding operation.
- i. All floor and wall openings must be covered to prevent sparks/slag from traveling to other unprotected area.
- j. Containers in or on which cutting/welding will take place must be purged of flammable vapors.

C. Fire Systems Shutdowns, Impairments, and Fire Watch

1. When it is necessary to shut down existing fire alarm systems or suppression systems for switch-over purposes, or any other reason that leaves the building unprotected, the Design-Builder shall provide a continuous Owner-approved "fire watch" in accordance AHJs and the following (unless the Design-Builder provides an Owner-approved temporary equivalent system or the Design-Builder is specifically excepted by the Owner):
 - a. Person(s) assigned to a fire watch must be trained in the use of the portable fire extinguisher.
 - b. Fire watch personnel must have an immediate means of providing notification to the fire department (e.g., cellular phone, land-line phone, two-way radio to a continuously staffed position) and the University Police.
 - c. Continuous rounds to cover all areas of the building where the fire protection system is out-of-service are required every 15 minutes.
 - (1) Exception for Building Code type "B occupancy" buildings: During the hours a B occupancy building is occupied, building occupants performing their duties, including construction personnel, may act as a fire watch in lieu of a designated fire watch, when approved in writing by Owner.
 - (a) A fire watch is required at all times in unoccupied areas.
 - (b) Other building code occupancy types may be allowed this exception when approved in writing by the Owner.
 - d. A log of rounds shall be maintained to include the name of the person performing the fire watch, the hours worked (including start and stop times), and comprehensive notes.
2. Fourteen (14) calendar days written notification shall be provided to the Owner's Representative requesting approval for fire protection system shutdown or functional

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impairment; receipt of written approval from the Owner's Representative is required before any system shutdown or functional impairment.

- a. In occupied buildings, include a plan indicating a method to notify all occupants.
 - b. Notify the local fire department.
3. The Design-Builder shall work in cooperation with the Owner to identify fire alarm initiating devices in and adjacent to the Project site that may activate from construction activities (i.e., work that creates dust, smoke, steam, heat, etc.) and develop a plan to temporarily cover, remove, or disable through programming these devices to eliminate the potential for false alarms.
 - a. The Owner may authorize in writing some devices to be disabled for the duration of the Work or for a particular activity without requiring a continuous "fire watch" for one shift or several days depending on circumstance.
 - b. **ONLY OWNER PERSONNEL SHALL DEACTIVATE OR DISABLE EXISTING FIRE DETECTION AND SUPPRESSION SYSTEMS**, unless the Design-Builder is specifically authorized in writing by the Owner to do so.
- D. **Fire Alarm/Suppression Systems False Activation or Discharge:** Most existing Owner buildings have active fire detection and suppression systems. If proper procedures as outlined in the Contract Documents and this Section 1.6C are not followed to ensure the unnecessary activation or deactivation of these systems, the Owner may at its sole discretion impose an emergency response charge of \$350 per occurrence to the Design-Builder and require a fire watch at the Design-Builder's cost. The Contract Sum will be amended for such amount by Change Order.
- E. **Fire Extinguishers Required for Construction:** Provide multipurpose dry chemical portable fire extinguishers for the Work in accordance with the International Fire Code Chapter 14, as locally amended, and as required by WISHA and other applicable regulations. Existing building fire extinguishers or new fire extinguishers specified by the Contract Documents for the Project do not alleviate Design-Builder's responsibility to provide temporary fire extinguishers for the Work.
- F. **Standpipes Required for Construction:** In new multi-story construction (four or more stories in height) a Class I standpipe shall be provided in accordance with Chapter 14 of the International Fire Code, as locally amended, for use during construction. Fire Department connections at bottom of standpipe shall be clearly marked and accessible at all times for fire department personnel and equipment. This requirement shall be reviewed and approved by the Owner's Representative.
- G. **Existing Fire Separations:** Existing fire separations, including floor-to-floor separations, shall not be impaired by construction activities.
- H. **Occupant Egress in Existing Buildings:** The Design-Builder shall not block active exits, exit hallways, exit corridors and the exit access to a public way.
 1. Exits are to remain free of construction materials, equipment, and rubbish at all times, unless approved by Owner.

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- I. Emergency Access: Outdoor storage and staging operations and construction fencing shall not impede egress, restrict or narrow fire fighting access (including roads or lanes), or present a fire exposure to existing buildings.
 1. Access to emergency services including, but not limited to, fire hydrants, fire department connections, fire command centers, fire alarm panels, valves and similar equipment and systems for emergency vehicles and emergency response personnel must be kept free and unobstructed at all times, unless specifically approved by the Owner.
 2. Temporary obstruction of emergency access may be allowed for special cases (e.g., crane installations and hoisting) on a short-term basis. A written plan must be submitted to the Owner for approval at least two weeks prior to the scheduled date of obstruction.

1.7 CHEMICAL HAZARD COMMUNICATION

- A. General: The Owner and the Design-Builder are responsible under the Washington Administrative Code 296-800-170 through 296-800-18020 (Employer Chemical Hazard Communication) to provide a safe and healthy environment for their employees.
- B. Responsibilities:
 1. The Owner maintains a centralized collection of all Material Safety Data Sheets (MSDS) for Owner materials. These MSDS are available to the Design-Builder if an unknown chemical is discovered in the work area; a worker is concerned about exposure; and the Design-Builder suspects the material originates with the Owner.
 - a. The Design-Builder shall coordinate with the Owner's Representative to receive this information.
 2. The Design-Builder shall establish a Chemical Hazard Communication Program (WAC 296-155-180) which includes multiemployer workplaces (WAC 296-800-17007), and provide hazard communication information and training to its employees and the employees of the Design-Builder's Subcontractors (of any tier).
 - a. The information shall include: signage demarcating regulated areas and entrances; signage indicating the location of the Design-Builder's binder containing all MSDS used for Construction; and prominently posted lists identifying all hazardous chemicals present in the workplace.
 - b. In addition to MSDS training which is regulated by the Employer Chemical Hazard Communication standard, training shall include those MSDS that are available for any Owner's chemical product present at the jobsite.
 3. The Design-Builder shall provide the Owner chemical hazard information (MSDS) for all chemical products the Design-Builder and the Design-Builder's Subcontractor's (of any tier) bring onto the jobsite for Owner's information prior to application including, but not limited to, all paints, glues, mastics, epoxies and cleaning products.
 - a. At the jobsite, the Design-Builder shall establish and maintain a binder(s) of all hazardous chemicals MSDS used for Construction and indicate where utilized.

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- (1) The MSDS shall be bound in a slant-D, 3-ring, view binder with clear vinyl overlay inserts on the front cover and spine. The binder shall have heavy duty nylon reinforced hinges.
- (2) The binder shall have a cover slip sheet and a spine sheet typed with "MSDS used for Construction," University Project name, University Project number, University Facility number, and Design-Builder name.
- (3) The MSDS shall be organized by specification division and section with tabbed dividers between the sections or, when presented in a logical format by Design-Builder and approved by Owner, between categories.

1.8 CHEMICALS OF INTEREST REPORTING

- A. Prior to construction work being performed by the Design-Builder and/or the Design-Builder's Subcontractors (of any tier), the Design-Builder shall submit to Owner a completed "Contractor (Design-Builder) Declaration and Reporting Form for Department of Homeland Security – Chemicals of Interest" for chemicals listed in 6 CFR (Code of Federal Regulations) Appendix A to Part 27 that will be used on the jobsite. Individual declarations shall be provided by the Design-Builder and the Design-Builder's Subcontractors (see Appendix A of Division 01 Forms for a copy of the form).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. General Requirements: Comply with the quality control provisions specified in the Contract Documents and perform quality control testing and inspection, and the surveillance of the Work for quality, unless specifically designated to be performed by Owner.
- B. Owner's forms referenced in this Section include (see Appendix A):
 - 1. Contractor Quality Control Daily Report
- C. Contractor Quality Control (CQC) shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction, and operations that comply with the requirements of the Contract Documents. CQC shall cover construction operations keyed to the Progress Schedule including, but not limited to, fabrication on-site and off-site, and field and factory tested construction mock-ups.
- D. Owner's special inspection and Testing Agency services are specified in Section 01 45 23 "Testing and Inspecting Services" which may be required to ensure the Work is in accordance with the Contract Documents, except where those tests are specifically indicated to be performed by the Contractor in the Contract Documents. These services do not relieve the Contractor of responsibility for compliance with Contract Documents requirements.

1.2 CQC MEETINGS

- A. General Work Plan Meeting: Design-Builder shall meet with Owner's Representative to discuss CQC procedures for the Project. Items for discussion shall include, but not be limited to:
 - 1. Identification of the Design-Builder's CQC Representative;
 - 2. Interrelationship of Design-Builder and Owner's Representative;
 - 3. CQC administrative procedures and pre-installation work plans;
 - 4. Submittals and persons responsible for Shop Drawing review;
 - 5. Forms for recording the CQC program;
 - 6. Testing, inspections and approvals records;
 - 7. On-site and off-site fabrication and installation procedures; and
 - 8. Field constructed mock-ups.
- B. Pre-installation CQC Work Plan Meetings: Develop a "CQC Work Plan" for each definable feature of the Work. Complete the work plan and submit to Owner with each notification requesting a pre-installation meeting. The work plan shall serve as the basis for discussion and review of the Contract Documents requirements. The work plan will assist to assure that materials and equipment delivered and assembled for construction conform to Contract requirements, and that control testing and CQC procedures are documented.
 - 1. When requested by the Owner, the Design-Builder shall revise a CQC Work Plan and provide the Owner a final CQC work plan with changes addressing comments or clarifications from the Owner's special inspection services or Commissioning Authority.

1.3 CONTRACTOR QUALITY CONTROL REQUIREMENTS

- 1. Identify a "CQC Representative" (who is not the superintendent) who shall be on the Project site during progress of the Work as required. The CQC Representative shall have complete authority to take those actions necessary to ensure compliance with the Contract Documents.
- 2. Identify persons responsible for review and approval of Shop Drawings and other submittals required by the Contract Documents.

DESIGN-BUILDER QUALITY CONTROL

- B. Qualifications of CQC Representative: The Design-Builder shall propose and Owner shall approve, in writing, the Design-Builder's CQC Representative. The CQC Representative must have construction management experience including prior experience with projects of similar construction, size, and complexity.
1. During progress of the Work, the Owner will monitor and evaluate the performance of the CQC Representative based on the conformance of the Work with the Contract Documents and an assessment of the accuracy, timeliness and completeness of the daily QC Report. If the CQC Representative fails to perform to the sole satisfaction of the Owner, the Contractor shall propose a replacement CQC Representative for the Owner's approval.
- C. Daily Quality Control Reports: CQC Representative shall maintain daily Quality Control (QC) Reports. The QC Reports shall be factual records containing numerical data of the Work and quality control activities and observations, including examination of work areas to verify the substrate upon which new work is to be placed. Submit QC Reports on Owner's form, or another Owner approved form, by the next workday following the day of the report.
1. CQC Representative shall verify and sign all reports. Verification shall contain the statement that all supplies and materials incorporated in the Work are in compliance with the Contract Documents.
- D. Control of On-Site and Off-Site Construction: Design-Builder's Quality Control procedures shall include the following phases of control and management for each definable feature of the Work:
1. Pre-installation Meeting: A pre-installation meeting shall be held prior to beginning work on each definable feature of the Work specified in the Contract Documents.
 2. In-Progress Inspection Phase: In-progress quality control testing and inspection, and surveillance of the Work for quality shall be performed continuously to verify that quality standards are maintained throughout the Work. Adjustment to quality control procedures and CQC work plans may be required, based upon the results of the inspections and testing.
 - a. The Design-Builder shall:
 - 1) Discuss quality control procedures at construction progress meetings;
 - 2) Report the results of the inspections and any changes to quality control procedures in the daily QC Report; and
 - 3) Revise CQC work plans for Owner's records, if changes are required.
 3. Above-Ceiling Final Inspections: The Design-Builder shall provide to the Owner a minimum two (2) week notice prior to ceiling installations to conduct above-ceiling final inspections.
 - a. The Design-Builder shall perform corrective work and provide reasonable time for the A/E to validate the work complete prior to covering from sight.
 4. Design-Builder's Final Punch List Report: The CQC Representative shall thoroughly inspect all aspects of the construction (including the Subcontractor's Work) and produce a final punch list report of work requiring correction and/or incomplete work that shall be issued to the Subcontractors with instructions to complete prior to requesting the Owner's final inspections. The Design-Builder's written request for Owner's final inspection shall certify that all features of the Work are installed and have been reviewed by the Contractor to determine compliance with the Contract Documents.
 - a. The Design-Builder's final punch list report shall be prepared by the Contractor utilizing the Owner's internet-based construction management system (CMS), in a format acceptable to the Owner.
 - 1) The report shall include a comprehensive Project room number list and additional entry listings for site work, building enclosure, roofs, and other items not designated with a room number to document the entire Project.

DESIGN-BUILDER QUALITY CONTROL

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- 2) The Owner's final inspections items will be added to the Design-Builder's final punch list report.
- 3) The Owner will manage the consolidated listing of all open inspection items until all items are signed-off by the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. General Requirements: Comply with the testing and inspection, and correction of Non-Conforming Work provisions specified in this Section and elsewhere in the Contract Documents.
- B. Owner's Responsibilities:
 - 1. The Owner will select and employ an independent "Testing Agency" to conduct the tests and inspections in accordance with applicable standard methods of the American Society for Testing and Materials (ASTM) or other standards as a requirement of the building permit.
 - 2. The Owner may provide other special inspection services to inspect and verify that the Work installed is in accordance with the Contract Documents and construction industry standards.
- C. Design-Builder's Responsibilities:
 - 1. All other tests and inspections which are required to obtain regulatory approval by Authorities Having Jurisdiction (AHJ) shall be provided by and paid for by the Design-Builder.
 - 2. The Design-Builder shall provide other testing services where specified in the Contract Documents.

1.2 DESCRIPTION

- A. Definition: For the purpose of this Section, all references made to Testing Agency, or waterproofing and roofing inspections, or geotechnical consulting firm shall be referred to as those tests or inspections which will be conducted by an inspector provided by the Owner.
- B. Testing and Inspection: Materials to be tested and inspected shall be as required by the authority having jurisdiction. Quantities and extent of tests and inspections shall be as specified and/or required by the Owner's inspector or AHJ.

1.3 QUALITY ASSURANCE

- A. Qualifications: The inspector for all work of this Section, except for geotechnical and waterproofing and roofing special inspectors, shall be a registered inspector employed by an approved inspection and/or Testing Agency as listed by the Washington Association of Building Officials (WABO) Special Inspection Registration Program. All inspection personnel used on this Project are subject to being disapproved from the Project at the sole discretion of the Owner's Representative. Minimum levels of qualifications as stated in the WABO Special Inspection Registration Program for various portions of the required Testing Agency inspections and testing must be complied with.
 - 1. The special Inspector for waterproofing and roofing must have the required technical knowledge and experience for the product being installed.
 - 2. The Owner may select a Testing Agency, other than the agency employed by the Design-Builder, to perform tests required by the building permit.
 - 3. Geotechnical inspection will be performed by a licensed geotechnical consulting firm.

1.4 DUTIES OF OWNER'S TESTING AGENCY

- A. General: The Testing Agency shall conduct testing and inspection services, interpret them, evaluate the results for compliance with the building permit and the Contract Documents, and report the findings to the Owner's Representative, Design-Builder, and AHJ. Testing and inspection services shall be in accordance with applicable standard methods of ASTM or other standards specified by AHJ, the Contract Documents, and construction industry standards. The Testing Agency shall reasonably support overtime, second shift, and out-of-area activity if requested by the Design-Builder and approved at the Owner's sole discretion.
- B. Non-Conforming Work: The Owner's inspectors will document and immediately notify the Design-Builder and the Owner's Representative of any Work found defective or not in accordance with the requirements of the Contract Documents.
- C. The Owner's inspectors are not authorized to:
 - 1. Release, revoke, alter, or enlarge on the requirements of Contract Documents;
 - 2. Approve or accept any portion of the Work, except as allowed by the special inspection duties delegated by AHJ for building permit inspections and testing;
 - 3. Perform any duties of the Design-Builder; or
 - 4. Stop the Work.

1.5 COSTS

- A. The Owner's Testing Agency and special Inspector costs for initial testing and inspection as specified in the Contract Documents will be paid for by the Owner. Initial tests and inspections are defined as those required to complete the first tests and inspections specified.
- B. Additional tests and inspections not specified but requested by the Owner shall be paid for by the Owner.
 - 1. However, if the results of such tests and inspections are found to be not in accordance with the Contract Documents, the Design-Builder will be back-charged for all costs of this testing and inspection as well as re-testing, re-inspection and Owner's consultants' services.
- C. Costs for additional tests or inspections required because of a Design-Builder change in products or materials, or source, after a submittal has been reviewed and accepted, shall be borne by the Design-Builder.
- D. Costs of any testing which is required solely for the convenience of the Design-Builder in its scheduling and performance of the Work shall be borne by the Design-Builder.
- E. Costs for verification testing and inspection of Work done without timely notice, with improper supervision, or contrary to construction practice, shall be borne by the Design-Builder.
- F. Costs for testing of materials for which fabrication and mill reports are required, but not furnished, shall be borne by the Design-Builder.

TESTING AND INSPECTION SERVICES

- G. Costs of any testing which is the responsibility of the Design-Builder as specified in the Contract Documents shall be borne by the Design-Builder.

1.6 TESTS AND INSPECTION REPORTS

- A. Copies of Test and Inspection Reports: Electronic copies of Owner's Testing Agency (or other special inspection services) reports and Design-Builder's test and inspection reports shall be exchanged between Owner and Design-Builder at weekly intervals and shall be provided to AHJ as required. All reports will be signed by a registered engineer. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested and records of special sampling operations that are required shall also be reported.
 - 1. Submit copies of inspection reports, certifications, notices, correspondence, and similar documents and records established in conjunction with building industry standards bearing upon the Work.

1.7 DESIGN-BUILDER'S RESPONSIBILITIES

- A. General: Inspection of the Work by the Owner's special inspectors and/or Testing Agency shall not relieve the Design-Builder from responsibility for compliance with Contract Documents requirements. Owner's special inspectors and/or Testing Agency and Owner's Representative shall have authority to reject Work whenever the provisions of the Contract Documents are not being complied with, and the Design-Builder shall instruct its employees accordingly.
- B. Coordination: The Design-Builder shall initiate, coordinate, and conform to the required tests and inspections of AHJ.
- C. Access for the Purpose of Inspection: The Design-Builder shall ensure the Owner's special inspectors and/or Testing Agency have free access to all parts of the Work and to the shops where the Work is in preparation; are provided proper facilities for safe access for such inspection; and are reasonably furnished equipment, tools, samples, certifications, test reports, design mixes, storage, and assistance as requested by the Owner's Inspector.
- D. Storage Facilities: The Design-Builder shall furnish adequate facilities for the sole use of the Owner's Testing Agency to provide safe storage and curing space for test specimens that must remain on-site prior to transport to the laboratory.
- E. Data: The Design-Builder shall furnish accepted submittals and approved Change Orders, certificates, and similar data as may be required by Owner's inspectors to perform their work to assure compliance with the Contract Documents.
- F. Notice: Furnish notice to Owner's Representative and coordinate with Owner's inspectors. Provide a minimum of five (5) working days notice in advance of all required tests and a minimum of forty eight (48) hours in advance of all required inspections, unless otherwise specified.
- G. Cancellations: Design-Builder shall give sufficient advance notice to Owner's Representative and Inspectors to allow rescheduling of their work load in the event of cancellation or time extension of any scheduled test or inspection.
 - 1. Any charges from an Inspector due to insufficient advance notice of cancellations or time extensions shall be borne by the Design-Builder, at the Owner's sole discretion.

1.8 TEST FAILURES

TESTING AND INSPECTION SERVICES

- A. General: The Owner's Representative may require a re-test of a sampled material when a sample or procedure has failed to pass the required tests. In such cases, two samples shall be tested and the material shall be rejected if either sample fails.

- 1. In the event any test or inspection indicates failure of a material or procedure to meet the requirements of the Contract Documents, all costs for re-testing or re-inspection shall be borne by the Design-Builder.

1.9 REPORTING TEST FAILURES

- A. General: Immediately upon determination of a test failure, the Owner's inspector shall telephone the test results to the Owner's Representative and Design-Builder. By the end of the following day, the Owner's inspector shall send written test results to those named on the distribution list.
- B. Design-Builder shall similarly report test failures to Owner's Representative resulting from work of testing agencies provided by the Design-Builder.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS**PART 1 – GENERAL****1.1 DESCRIPTION OF REQUIREMENTS**

- A. Minimum temporary facilities and controls requirements are specified in this Section. Nothing in this Section is intended to limit the types and amounts of necessary temporary facilities required to perform the Work, and no omission from this Section will be recognized as an indication that a necessary temporary facility is not required for successful completion of the Project, and compliance with the requirements of the Contract Documents and all applicable codes.
- B. Included in this Section are the following headings:
 - 1. Product Delivery, Storage and Handling
 - 2. Project Site - Work Area
 - 3. Protection of Existing Utilities
 - 4. Shutdowns of Existing Equipment and Utility Services
 - 5. Temporary Support Facilities
 - 6. Temporary Enclosures and Miscellaneous Construction
 - 7. Noise and Vibration Control
 - 8. Construction Parking and Staging
 - 9. Construction Traffic
- C. Owner's forms referenced in this Section include (see Appendix A):
 - 1. UW Utility Shutdown Request form, as appropriate.
- D. Behavior:
 - 1. The Owner will not tolerate inappropriate behavior by any worker on a jobsite toward a student, staff, visitor, neighbor or employee.
 - 2. The Design-Builder shall not allow obscene, offensive or otherwise inappropriate material to be displayed at the Project site, or at remote construction staging and parking areas, including job offices and trailers. If such material is displayed, it shall be immediately removed by the Design-Builder and/or when requested by the Owner's Representative.
 - 3. Gratuities to Owner's employees by a Design-Builder are not allowed per Washington Administrative Code, Chapter 42.52 RCW.
- E. Conservation: The Design-Builder shall install and operate temporary facilities and perform construction activities in a manner which reasonably will be conservative and avoids waste of energy and materials, including water.
- F. Pest Control: The Design-Builder shall rid the Project site of rodents, birds, insects, and other pests which may have entered buildings under construction as a result of the work.
- G. Pollution Control: The Design-Builder shall perform the Work so as to prevent water, soil, and air pollution.
 - 1. The Design-Builder shall not discharge volatile, harmful, or dangerous materials into the Owner's sanitary sewer and storm water drainage systems.
 - a. Non-storm water discharge into the Owner's storm water system is prohibited, including the following types of discharge, unless the stated conditions are met:

TEMPORARY FACILITIES AND CONTROLS

- (1) Discharges of potable water for, but not limited to, water line flushing, hyper-chlorinated water line flushing, fire hydrant system flushing, and hydrostatic test water must be de-chlorinated to a concentration of 0.1 parts per million or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments in the storm water system.
 - b. Street sweeping must be performed prior to washing the street at construction sites.
 - c. All discharges to the sanitary sewer require Owner's prior approval.
2. The Design-Builder shall not cause or allow visible emissions of fugitive dust from the construction site, unless reasonable precautions are employed to minimize the emissions. Reasonable precautions include, but are not limited to, the following:
 - a. During high winds, the use of control equipment and/or enclosures, the reduction of construction vehicle speeds, and the curtailment of all dust creating construction procedures shall be implemented.
 - b. When demolition, excavation, and construction activities generate dust, the construction site shall be sprinkled with water or chemical stabilizers to minimize dispersion.
 - c. Truck under-carriages shall be brushed to minimize the transporting of dirt off construction sites.
 - d. Truckloads shall be covered, wetted, or allowed adequate freeboard to prevent the escape of dust-bearing materials.
- H. Silica Dust Control: The Design-Builder shall use best engineering and work practice controls to reduce exposure to silica dust at or below the Washington State Permissible Exposure Limit defined in the latest regulations from the Washington State Department of Labor and Industries (L&I), Puget Sound Clean Air Agency (PSCAA) and any other applicable federal, state, and local government regulations.
 1. The Design-Builder shall assume that silica is present in all concrete, mortar, terrazzo flooring, plaster, sheetrock, fireproofing and other related building products.
 2. The Design-Builder shall implement controls to contain and clean-up silica dust generated by cutting and demolition work and shall provide worker and equipment decontamination provisions. At no time is silica dust from the construction permitted beyond the "work area."
 - a. The Design-Builder shall conduct air sampling for respirable crystalline silica in accordance with the National Institute for Occupational Safety and Health (NIOSH) method 7500.
 - b. The Design-Builder shall comply with OSHA 29 CFR Part 1926.134, WAC 296-62-071 (Respiratory Protection) and ANSI Standard Z88.2-1990 "Practices for Respiratory Protection."

1.2 PRODUCT DELIVERY, STORAGE AND HANDLING

TEMPORARY FACILITIES AND CONTROLS

- A. Deliver, store, and handle specified products in accordance with the manufacturer's recommendations and use means and methods that will prevent damage, including, but not limited to, moisture damage of materials, deterioration, and loss or theft.
 - 1. Store materials and products off the ground and protect from weather.
- B. Furnish products in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- C. Include a waste reduction provision in purchasing agreements requiring that materials and equipment be delivered in packaging made of recyclable material, that the amount of packaging be minimized, and that packaging be taken back for reuse or recycling.
 - 1. The Design-Builder shall require the same provisions in its Subcontractor's purchasing agreements.
- D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are dry and mold free, undamaged, and properly protected.
- E. Store products at the Project site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- F. Store heavy products away from the Project structure in a manner that will not endanger the supporting construction.
- G. Protect building products subject to damage, under cover in a clean and weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
- H. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 - 1. Ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

1.3 PROJECT SITE - WORK AREA

- A. Confine operations, equipment, and storage to the designated work area.
 - 1. Design-Builder will be given access to the Project site for purposes of design and later for construction in a Notice to Proceed (NTP) from Owner. Physical occupancy of the Project site prior to receipt of NTP, for any reason other than observation and measurement during design, is prohibited, unless authorized specifically by Owner.
 - 2. Maintain the Project site, including adjacent areas and properties, in a clean and orderly manner free from accumulations of combustible materials and construction waste, including rubbish and debris resulting from construction operations. Clean indoor work areas daily of construction waste, dirt, and dust. Do not store construction materials and equipment in Owner-occupied areas unless approved by the Owner. Immediately clean up any spilled material and/or fugitive construction spoils or debris from adjacent properties and vehicle travel ways. Keep streets, fire lanes, and walks clean and free from obstructions.
 - 3. Mechanical rooms shall not be used for construction storage, unless approved by Owner.

TEMPORARY FACILITIES AND CONTROLS

4. All masonry cutting is to be done outdoors. Cut stations for all other work shall be located outdoors or within well ventilated dustproof enclosures or other approved containment.
- B. Security:
1. General:
 - a. Protect work and stored products from theft and vandalism and protect premises from entry by unauthorized persons. At the end of workday, close temporary enclosures and lock exterior doors and/or gate. Secure all openings at any time the Project site is left unoccupied.
 - b. Owner's Keys: Owner's Representative will issue keys, as required, for the Contractor to perform the Work. Prior to Substantial Completion, the Contractor will return all issued keys. Contractor's responsibility shall include, but not be limited to, the following:
 - (1) Arrange for the issuance of access keys on a daily basis, or as mutually agreed with Owner.
 - (a) Owner's costs associated with re-keying a system, including an entire tunnel system, due to lost keys shall be the responsibility of the Contractor.
 - (2) Lock all access doors when not attended and at the end of each shift.
 - (3) Provide security barriers, acceptable to Owner, at all utility openings which are created by the removal of gratings and/or the opening of utility tunnels or shafts.
 - (4) Coordinate Work to minimize need for access to restricted areas.
 - c. Many buildings and spaces on Campus are high security areas, such as building mechanical and electrical equipment rooms, certain lab spaces, and computer facilities. Contractor shall use due care to maintain an equivalent level of security of Owner's property, where appropriate, and as it normally exists (i.e., secure areas when not actively working). Normally locked or closed doors shall not be propped open.
 - d. Design-Builder is advised to lock its gang boxes and secure them to the construction. Owner will not reimburse Design-Builder for any lost or stolen tools, material or equipment.
- C. Construction Waste: Remove construction collected materials from the Project site at a frequency acceptable to the Owner and dispose of in a lawful manner. Do not burn waste material, stockpile waste material, or bury waste material on Owner's property. Do not use Owner's waste containers for construction waste of any kind, unless approved by Owner. Dispose of all refuse and waste material, including excess earth from excavation, off of Owner's property.
1. See Section 01 74 00 "Construction Waste Management" and, when specified, Section 01 11 01 "Summary of Work – Regulated Materials" for additional requirements.
- D. Odor Control:

TEMPORARY FACILITIES AND CONTROLS

1. General: Adjacent Owner areas and/or neighboring buildings may be occupied during construction. The use of solvents and materials producing noxious fumes or any product or equipment that adversely impacts air quality shall be subject to the approval of Owner. Isolate odor-causing work away from building air intakes, private properties and pedestrian traffic areas. Where solvents are used within enclosed structures, vent to outside areas.
 2. Emissions Control Plan: The Design-Builder shall submit a written procedure for control of emissions prior to any use.
 - a. The plan shall at a minimum consist of the following items:
 - (1) Products to be used/Material Safety Data Sheets
 - (2) Location of Work
 - (3) Application
 - (4) Ventilation plan
 - (5) Hours of operation
 - (6) Materials handling/storage
 - b. Considerations shall include, but are not limited to:
 - (1) Concrete curing
 - (2) Roofing and waterproofing
 - (3) Welding
 - (4) Exterior painting
 - (5) Adhesive and/or stripping or paint removal
 - (6) Asbestos abatement
 - (7) Soil remediation
 3. Equipment and trucks producing fumes shall not be parked or located in the vicinity of building air intakes, entrances, and operable windows, unless approved by the Owner. Construction equipment, vehicles and deliveries must be coordinated with Owner's Representative to minimize the disruption of services of nearby occupied buildings.
 - a. Trucks that are idling for more than a few minutes shall shut off their engines. If trucks are queued and idling, there must be at least 20 feet between each truck or the exhaust shall be piped to have a 20-foot separation between each exhaust.
 - b. All diesel-powered construction equipment shall utilize ultra-low sulfur diesel fuel.
 - c. All diesel-powered construction equipment and trucks must be: 2007 model year or later (for vehicles); or Tier II heavy duty (for stationary engines); or equipped with 3-CARB verified oxidation catalyst-based particulate emissions control devices, operating at 600 degrees F or above.
- E. Smoking: The University of Washington has restricted smoking policies. The Design-Builder shall not permit its employees or the employees of its Subcontractors of any tier to smoke on the Owner's property, except in the areas indicated below:
1. The Owner has designated specified areas where smoking is permitted. These areas are identified on maps that may be found at the following website address:
 - a. For the Seattle Campus:
<https://www.chs.washington.edu/environmental/designated-areas-smoking-and-vaping>

TEMPORARY FACILITIES AND CONTROLS**1.4 PROTECTION OF EXISTING UTILITIES**

- A. Any existing concealed utilities shown on the RFP Drawings are not necessarily exact with respect to location or completeness. Therefore, the Design-Builder shall take the following steps:
1. Proceed with sufficient caution to preclude damaging any known utilities (i.e., hand digging or probing). In the event unidentified utilities are encountered, notify Owner's Representative immediately.
 2. In the event utilities are damaged during construction, temporary services and/or repairs must be made immediately to maintain continuity of services.
 - a. Utilities installed by the Design-Builder, and damaged by the Design-Builder, shall be repaired at the Design-Builder's sole expense.

1.5 SHUTDOWNS OF EXISTING EQUIPMENT AND UTILITY SERVICES

- A. It is critical that all building systems remain operational within nearby occupied buildings, except for brief shutdowns that might be required to integrate or connect new Work. Similarly, continuity of equipment and utility services to adjacent buildings and Owner's site infrastructure shall also be maintained at all times.
- B. Equipment or utility shutdowns required to facilitate the Work shall be accomplished in accordance with the following requirements:
1. Submit a schedule of equipment and utility shutdowns as a part of CPM schedule.
 2. Submit a Utility Shutdown Request form to schedule all equipment and utility shutdowns not less than fourteen (14) days prior to the proposed date. Include, as a minimum, the following information:
 - a. Equipment or utility services affected
 - b. Reason shutdown is required
 - c. Work to be accomplished during the shutdown
 - d. Proposed date and time
 - e. Duration of the shutdown
 - f. Proposed method of providing back-up service during shut down
 3. The actual time and date of all shutdowns will be subject to approval of Owner. Shutdowns normally will be scheduled for nights, weekends, or other low intensity use periods.
 4. The duration of all shutdowns shall be held to a reasonable minimum as determined by Owner.
 5. Materials and equipment required for the Work to be accomplished during shutdown shall be complete and available on the job for review by Design-Build team three days prior to the shutdown, if requested. If Design-Builder is not adequately prepared, the shutdown will be canceled and rescheduled.
 6. **ONLY OWNER'S PERSONNEL WILL SHUT DOWN AND RESTART OWNER'S EQUIPMENT AND UTILITIES.** Owner will inspect the installation prior to restarting and will not restart if an unsafe condition exists. In the event Design-Builder's Work is not completed during the time scheduled for the shutdown, Owner may elect to restart the

TEMPORARY FACILITIES AND CONTROLS

equipment or utility service. In that event, additional shutdown requirements shall be rescheduled in accordance with the preceding requirements. Restarting shall not be construed as acceptance of the Work as complete.

7. Include in the Proposal all costs associated with equipment and utility shutdowns. Owner will make no extra payment for overtime work, schedule changes or failure to complete utility connections within authorized shutdown periods.

1.6 TEMPORARY SUPPORT FACILITIES

- A. Temporary support facilities include: construction power and lighting and heating and water, toilet and hand washing facilities, mobile communications, cranes and hoists, field offices, and field office communications; and similar miscellaneous facilities (i.e., storage sheds, first aid facilities, clean-up facilities, fire protection, waste disposal) as may be reasonably required for proficient performance of the Work and accommodation of personnel at the Project site, including Owner's personnel. Locate temporary support facilities for convenience of users, and for minimum interference with construction activities. Placement of all temporary support facilities shall be subject to review and approval by the Owner's Representative.
 1. Do not block Owner's or other property owners' access to adjoining buildings and occupied spaces through the use of temporary support facilities.
 2. Keep temporary support facilities clean and neat in appearance and do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload temporary facilities or permit them to interfere with progress.
 3. Erection and dismantling of cranes shall occur only on weekends, unless otherwise approved in writing by the Owner.
- B. Remove all temporary support facilities including, but not limited to, power and water infrastructure, hoist foundations, and communications cabling and pathway, unless indicated otherwise in the Contract Documents. Restore the Project site to original or new conditions, patching and filling as required to match adjacent surfaces.
- C. All connections to Owner utilities must be made in accordance with 1.5 of this Section, "Shutdowns of Existing Equipment and Utility Services."
 1. Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of the permanent service.
- D. Electrical Power and Service: Design-Builder shall pay for, provide, and install all necessary Owner-approved temporary equipment required for use of the Owner's electrical power for minor renovations and/or alterations construction work within the Project site of an Owner-occupied facility. Temporary equipment shall be installed and maintained in accordance with all applicable safety regulations and the Owner's requirements.
 1. Electrical power for the operation of small tools and equipment required for work outside of the Project site will be provided by the Owner as reasonably available from approved existing sources.
- E. Lighting: Provide and maintain LED (light-emitting diode) type construction lighting to provide adequate general illumination of the work area and trade task lighting. Shield construction lighting from adjacent residential areas.

TEMPORARY FACILITIES AND CONTROLS

- F. Heating and Ventilation: Provide temporary heat as required to protect materials and equipment from dampness, cold, and mold growth. Method of heating is subject to approval of Owner's Representative. Fuel fired "salamander type" heaters are not permitted, unless approved by Owner.
- G. Water: For construction purposes, will be furnished by Owner.
1. Design-Builder shall pay all costs of temporary piping, including pressure reducing station, double backflow preventer, removal of piping and restoration of Owner's utilities at the completion of the Work. Piping of temporary water service shall not exceed the capacity of the Owner's system and shall be limited to 1-1/2" pipe size.
 2. Design-Builder shall provide drinking water from a proven safe source for all those connected with the Work.
 - a. The Owner's "potable" water drinking facilities may be used, if available and approved by Owner.
- H. Toilet and Hand Washing Facilities: Design-Builder shall provide self-contained properly ventilated single-occupant toilet units of the chemical or aerated circulation type that are fully enclosed with a glass fiber reinforced polyester shell, or similar nonabsorbent material, and portable hand washing facilities.
1. The Owner's toilet facilities may be used if available and provided they remain in a clean condition, as approved by Owner.
- I. Not used.
- J. Mobile Communications: The Design-Builder shall provide cellular phones with e-mail capability for its key on-site personnel.
- K. Design-Builder's Field Office: It is not anticipated that the Owner will provide space within existing buildings for the Design-Builder's field office. Design-Builder shall arrange for field office space for its own personnel as required. Owner will arrange for office space for Owner's personnel. Construction staging and project offices will be allowed only at locations designated by Owner. The location options are: Unimproved University-owned property south of the Project site; Right-of-way adjacent to the site, only as permitted by the City of Tacoma; or otherwise agreed upon, in writing, by Owner.
- L. Crane(s) & Hoisting: Provide crane(s) and hoisting including all tower cranes, mobile cranes, forklifts and specialized lifting apparatus and temporary base construction, as required for the Work. All Operators shall be appropriately licensed. Removal of tower crane base shall be Design-Builder's responsibility.
- M. Elevator Operations and Personnel Hoists: Provide elevator operation and personnel hoists including all temporary and permanent elevator operations.

1.7 TEMPORARY ENCLOSURES AND MISCELLANEOUS CONSTRUCTION

- A. Barriers, Safety Guards and Warnings: provide for public protection as required by law and ordinance. Keep streets and walks clean and free from obstructions.
- B. Site Fences: Provide temporary six (6) foot high chain link fence panels with top rail fastened to tubular metal posts set in heavy concrete bases to prevent ready relocation, unless otherwise indicated, to enclose exterior areas of the Project site and off-site lay-down and

TEMPORARY FACILITIES AND CONTROLS

Design-Builder parking areas provided by the Owner. Panels are to be anchored together to prevent entry between panels. Provide gates or equal to facilitate access to fire hydrants, pumper connections and standpipes. No barbwire is permitted.

- C. Provide miscellaneous construction to protect the Work. Furnish, install, and maintain for the duration of construction all required tarpaulins, barricades, security barriers, canopies, warning signs, steps, bridges, platforms and other temporary construction necessary for the safe and proper completion of the Work. Maintain the temporary construction in compliance with all pertinent safety and other regulations.

1.8 NOISE AND VIBRATION CONTROL

- A. Construction shall not exceed the maximum permissible sound levels defined by the local AHJ and shall meet the special conditions of the Project.
- B. Exterior Construction Noise: Maintain the sound pressure level of exterior construction noise from exceeding decibels with a frequency rating function A (60 dBA) inside adjacent facilities with windows closed between the hours of 8:00 a.m. and 5:00 p.m. weekdays.
 - 1. If required, the Design-Builder shall meet this criterion by erecting barriers between work equipment or job and adjacent facilities.
 - 2. When possible, combine noisy and vibration-producing operations into one time period.

1.9 CONSTRUCTION PARKING AND STAGING:

- A. Parking permits are required for all vehicles parking on campus. Parking without a valid parking permit will result in citation and possible impound of vehicle.
 - 1. Parking on or near the University of Washington and Harborview Medical Center is congested. To minimize disruptions to campus operations and the impact on the adjacent neighborhoods, the Design-Builder shall limit the number of vehicle trips to the Project site and encourage carpooling. In addition, the Design-Builder shall advise construction workers not to park on city streets and in neighboring residential areas.
 - a. Parking on the University of Washington campus, outside a fenced Project site, is not available or permitted for the Design-Builder and its Subcontractors' vehicles on the dates of graduation, convocation, and on Husky football game days.
 - b. This information shall be posted at the Project site along with bus pass/ticket information.
- B. There is no Staging area of contractor parking available in the UWMC and Health Sciences area. Only limited loading and unloading of tools and material will be allowed at the loading docks for posted time limits. Design Builder and their Subcontractors shall be allowed to purchase a limited number of short term parking permits for parking lot S-8 and other lots arranged and designated by the Owner's Representative for their construction vehicles.
- C. Not Used.
- D. Seattle campus parking and traffic regulations can be found online by visiting <http://www.washington.edu/admin/parking>.
- E. Seattle campus parking fees website: Current parking rates can be found online by visiting <http://www.washington.edu/commuterservices/parking/fees.php>.

TEMPORARY FACILITIES AND CONTROLS

1.10 CONSTRUCTION TRAFFIC:

- A. The Design-Builder and the Design-Builder's Subcontractors and suppliers shall minimize negative traffic impacts on city streets for construction. Scheduled truck traffic shall avoid the peak hours of 7:00 – 9:00 AM and 3:00 – 6:00 PM, Monday through Friday.
- B. Deliveries on the UW Seattle campus: If a Design-Builder, a Design-Builder's Subcontractor, or supplier needs to make a delivery, the driver must stop at a Campus gatehouse upon entry during the posted hours of operation for UW Parking Services and obtain a commercial delivery permit.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

TEMPORARY TREE AND PLANT PROTECTION**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies minimum requirements for protection from damage as a result of the Design-Builder's operations and for maintenance of existing trees, shrubs, and other plant materials including lawn surfaces indicated to remain on the Project site.
- B. The Design-Builder shall ensure all labor, equipment, and materials are provided for temporary tree, plant, and lawn protection during the work including, but not limited to:
 - 1. Marking of clearing limits;
 - 2. Protection signage and fencing;
 - 3. Tree trunk boxing;
 - 4. Tree and root pruning; and
 - 5. Maintenance of trees and landscaping.
- C. Definitions:
 - 1. Landscape Requiring Protection and Maintenance: All existing on-site trees, plants, and lawn areas which are not identified for Design-Builder's lay down or parking use, including tree canopies and root zones extending within the Project site.
 - 2. Maintenance: All existing on-site trees, plants, and lawn areas are to be maintained in accordance with standard horticultural practice. Trim or prune all plant materials regularly, remove weeds (undesirable plants) prior to going to seed, replenish mulch on a periodic basis, and water and fertilize all plant materials.
 - 3. Critical Root Zone (CRZ): The area around a tree equal to one (1) foot radius for every inch of tree diameter measured at four (4) feet above grade.
 - 4. Certified Arborist: An arborist certified by the International Society of Arboriculture (ISA).
 - 5. Dripline: The dripline of a tree is the imaginary line on the ground beneath the tree's canopy.

1.2 SUBMITTALS

- A. Tree and Landscape Protection Plan: Prior to any site disturbance, the Design-Builder shall submit for Owner's approval a "Tree and Landscape Protection Plan" developed in consultation with a certified arborist for all trees, plants, and lawn indicated to remain. The Design-Builder shall submit the name and credentials of the certified arborist with the plan.
 - 1. The Tree and Landscape Protection Plan shall include:
 - a. Proposed protection fence locations;
 - b. A site plan indicating the location of all on-site trees requiring protection (For the Seattle campus, identify each tree on the plan by UW tree inventory tag-number);
 - c. Identification of the CRZ for each tree requiring protection; and
 - d. Temporary irrigation, weed removal, mulching, and fertilization schedule.

1.3 DESIGN BUILDER RESPONSIBILITY

TEMPORARY TREE AND PLANT PROTECTION

- A. The Design-Builder shall assume all landscape shall be protected, unless indicated to be removed, and shall be responsible for all damage and/or disturbance within the CRZ of trees indicated to remain, including, but not limited to, cutting or skinning of roots, skinning or bruising of bark, compaction of root zones, and breaking of branches.
1. Damage and/or disturbance which, by mutual agreement of the Owner and Design-Builder, can be remedied by corrective maintenance shall be immediately repaired by the Design-Builder upon written notice by Owner.
 - a. The Design-Builder shall employ a certified arborist to repair damage to trees.
 2. Trees or shrubs which are injured or irreparably damaged shall, by mutual agreement of the Owner and Design-Builder, be replaced by the Design-Builder with new trees or shrubs of the same size and type. However, the Owner is not bound to have the trees or shrubs replaced in the same location and may request the Design-Builder provide the tree or shrub for installation by Owner.
 - a. Trees or shrubs are injured or irreparably damaged if they fail to partially or fully foliate in the spring following Substantial Completion.
 3. If, in the Owner's and Design-Builder's opinion, replacement of damaged trees is determined impracticable, the full replacement cost shall be borne by the Design-Builder at values based upon the square inches of cross sectional area of trunk measured at four (4) ft. above grade, in accordance with the following criteria:
 - a. \$75.00/square inch for trees less than or equal to six (6) inch diameter
 - b. \$50.00/square inch for trees greater than six (6) inch and less than eighteen (18) inch diameter
 - c. \$40.00/square inch for trees greater than or equal to eighteen (18) inch diameter
 4. Design-Builder shall credit the full replacement cost in a Change Order.
- B. Trees or shrubs which require removal and/or replacement due to damage by construction shall be removed to a depth of two (2) feet below grade and include the refilling and repair of the ground surface, with such costs to be borne by the Design-Builder.
- C. Protection and maintenance shall include, but not be limited to, replacement of damaged protection fencing; aeration of compacted soils; control of temporary irrigation water runoff; pruning and treatment of damaged roots, limbs, and branches; weed removal; and replacement of wood chips within tree protection areas.
- D. Site damage and/or disturbance caused by the Design-Builder outside the Project site shall be repaired or replaced, and all costs shall be borne by the Design-Builder.
1. Repairs shall include, but are not limited to, pruning or removing damaged vegetation, replacement of damaged vegetation and/or lawn restoration, soil remediation to alleviate over-compaction, and temporary irrigation to establish new plantings.

PART 2 - PRODUCTS**2.1 PROTECTION FENCING**

TEMPORARY TREE AND PLANT PROTECTION

- A. Protection fencing shall be a minimum of six (6) feet high with galvanized steel posts and mesh. The fence shall be comprised of either removable panels or driven steel posts as agreed upon by the Owner and Design-Builder.
 - 1. The Design-Builder shall post weather-resistant 8 1/2" x 11" fluorescent green or yellow signage on protection fencing at twenty (20) foot intervals warning construction personnel to keep out of protective zones.
 - 2. The Design-Builder shall provide, install and maintain view obscuring mesh panels on the fencing. Maintenance includes removal and replacement of damaged or graffiti painted panels. The Owner, at their discretion, may provide custom view obscuring panels.

2.2 TREE TRUNK BOXING

- A. Existing trees that are not protected with fencing and are to remain shall be protected by boxing constructed with 4 x 4 inch posts at corners with 2 x 4 inch horizontal top, middle, and bottom rails on each side. Each side of the box shall be sheathed with plywood materials suitable for exterior conditions. Box shall be approximately 8 x 8 feet in size centered on the tree trunk to a height of approximately six (6) feet.

2.3 WOOD CHIPS

- A. Wood chips shall be composted for a minimum of one (1) year prior to use and be seed free.

2.4 FERTILIZER

- A. Fertilizer shall include products mutually approved by the Owner and Design-Builder.

PART 3 - EXECUTION**3.1 ON-SITE PRE-INSTALLATION MEETING**

- A. Prior to on-site mobilization, the Design-Builder shall arrange a pre-installation meeting with the Owner to identify and stake out all areas of trees, plants, and lawn that are to be protected or removed. The Design-Builder shall be responsible for all damage to landscape features that results from the failure to schedule and attend the pre-installation meeting.

3.2 PROTECTION OF EXISTING TREES AND SHRUBS

- A. Trees indicated to remain within the Project site shall have protection fencing located at the CRZ drip line that shall be maintained by the Design-Builder in good condition until Substantial Completion. Tree trunk boxing may be permitted by approval of Owner.
- B. When no ground cover, lawn or shrubs exist within the CRZ of a tree indicated for protection, the ground shall be protected with a minimum of twelve (12) inches of wood chips extending from a three (3) foot radius clear zone around each trunk to the protection fencing.
- C. All site work within the CRZ shall be performed by hand. Use of heavy equipment to perform work within the CRZ may be requested by the Design-Builder for approval by the Owner. The Design-Builder shall perform approved heavy equipment work from angles and directions that minimize compaction to tree roots in the protection area.
- D. The Design-Builder shall utilize a certified arborist to tie back all flexible limbs and overhead branches which may be damaged by the passage or activity of construction equipment.

TEMPORARY TREE AND PLANT PROTECTION

- E. Materials shall not be stored and equipment shall not be operated under the branches of existing trees which are to remain, except as approved by the Owner.

3.3 INSTALLATION OF TREE PROTECTION FENCING

- A. Install driven posts a minimum of two (2) feet below grade and spaced ten (10) feet on center maximum. Provide diagonal bracing to posts and fence panels at corners of enclosures and whenever needed to ensure rigidity of the fencing.
- B. Install fencing tight to grade at the bottom edge and stretched uniformly between posts.
- C. Free standing fence panel sections shall be securely fastened to concrete or steel pipe bases and to adjacent fence panel sections. Provide perpendicular fence panels and bases as required to resist fence collapse.
- D. Provide a minimum of one gate into each fenced area.
- E. Take care not to damage roots or to compact soil inside the fence line during placement of posts. Do not use heavy equipment within the protection area for this operation.

3.4 USE OF AREA ADJACENT TO PROTECTION FENCING

- A. Do not store materials potentially harmful to tree roots within twenty (20) feet of protection fencing. Potentially harmful materials include, but are not limited to, heavy objects, petroleum products, cement and concrete materials, cement additives, lime, paints and coatings, waterproofing products, concrete forms coatings, detergents, acids, and cleaning agents.

3.5 MAINTENANCE DURING CONSTRUCTION

- A. All trees and landscape requiring protection shall be maintained by the Design-Builder until Substantial Completion, per the approved Tree and Landscape Protection Plan.
 - 1. Water used for irrigation shall be potable water.

3.6 ROOT PRUNING

- A. Root pruning is the intentional cutting of tree roots to minimize root damage and promote healing. Any construction operation which pulls and/or tears roots is unacceptable.
 - 1. All root pruning shall be performed by a certified arborist.
 - 2. For all roots smaller than one (1) inch diameter, use a sharpened spade.
 - 3. For all roots greater than one inch (1) diameter, use an ax or chainsaw.
 - 4. A backhoe bucket, or any other excavating machine, should not be used to root prune.
- B. When construction is in close proximity to existing trees to remain, and roots are encountered, the roots shall be pruned unless an alternate method is mutually agreed upon by the Owner and Design-Builder.
 - 1. Root pruning shall be performed as early as possible before trenching or tunneling operations.
 - a. Hand-dig trenches in areas with extensive roots.
 - 2. Leave roots larger than two (2) inches in diameter intact and undamaged.

TEMPORARY TREE AND PLANT PROTECTION

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- a. Keep roots moist with wet mulch and burlap or equivalent during exposure.
- C. Backfill trenches that require root pruning with existing soil mixed with peat moss to a mixture of approximately 75% loam and 25% humus by volume. Tamp soil in six-inch lifts. Each lift shall be compacted to a point at which a foot print makes only a 1/16 inch impression.
- D. Apply mulch to a depth of four (4) inches at a minimum ten (10) to fifteen (15) foot radius around tree to reduce compaction and increase moisture retention.

3.7 PRUNING OF EXISTING TREES

- A. Design-Builder shall utilize a certified arborist to remove limbs and branches broken by construction. Injured or irreparably damaged limbs and branches shall be cut off cleanly above the nearest crotch in accordance with good horticultural practice.

3.8 REMOVAL OF TEMPORARY PROTECTION

- A. Prior to Substantial Completion, and when potential damage to existing plant materials is no longer anticipated, all temporary protections around existing plant materials shall be removed. Site areas shall be restored and maintained as required by any landscape warranty throughout the Warranty Period.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies the administrative and procedural requirements for field engineering, in addition to requirements specified elsewhere in the Contract Documents, requiring the Design-Builder to employ a registered "Structural Engineer" and/or "Land Surveyor."
- B. Related Sections:
 - 1. Section 01 73 29 "Cutting and Patching"

1.2 QUALITY ASSURANCE

- A. Design-Builder shall employ a registered Structural Engineer (Design-Builder's Structural Engineer) experienced in construction techniques and sequences, and temporary structural support systems, who is licensed in the State of Washington.
- B. The Design-Builder shall employ a registered Land Surveyor (Design-Builder's Surveyor) who is registered in the State of Washington, and acceptable to Owner, to perform survey work of this Section.
- C. Submit the name, address, and telephone numbers of the Design-Builder's Structural Engineer and Land Surveyor for Owner's records, prior to their performance of Work.

1.3 DESIGN-BUILDER'S STRUCTURAL ENGINEER

- A. The Design-Builder's Structural Engineer shall advise the Design-Builder as to the safety and adequacy of all temporary structural provisions necessary for cranes and hoisting, erection and/or alteration of the building structure and shall assume the responsibilities and duties as it relates to means and methods for these items (e.g., erection sequence, temporary bracing, cutting).
 - 1. Temporary bracing shall be coordinated with other trades to permit continuous operation of construction.
 - 2. Should it be necessary to modify the structural design to accommodate construction means and methods, the Structural Engineer shall advise the Design-Builder.

1.4 OWNER'S PROPERTY SURVEY

- A. Owner's property survey for the Project is included in the Contract Documents.
- B. The Owner will provide the services of a public land surveyor to locate the property corners noted on the Contract Documents and establish benchmarks for use by the Design-Builder.

1.5 PROJECT SURVEY REQUIREMENTS

- A. Before proceeding with layout of actual work, the Design-Builder, working through the Design-Builder's Surveyor, shall verify the layout information shown on Contract Documents and the Owner's property survey.
- B. As work proceeds, the Design-Builder shall check every major element for line, level and

plumb, and shall require the Design-Builder's Surveyor to maintain a complete and accurate record book log of control of such checks and upon request shall make this log of control available for the Owner's reference.

1. Record deviations from required lines and levels and promptly advise the Owner's Representative upon detection of any discrepancies including, but not limited to, conflicts, errors, inconsistencies, or deviations that exceed the Contract specified or indicated or industry recognized tolerances.
 2. If discrepancies are found, no work shall be done until the Owner's Representative has been so notified and has provided the Design-Builder with written direction and/or drawings which correct and clarify the discrepancy.
 3. All work which is determined to be incorrectly located will be rejected by the Owner. Any additional corrective work caused by discrepancies that should reasonably have been known to the Design-Builder and were not called to the attention of the Owner's Representative, shall be borne at the Design-Builder's expense.
- C. Protect Owner's benchmarks and survey control points prior to starting site work and preserve during construction. Do not change or relocate benchmarks or control points without Owner's written approval. Promptly report lost or destroyed benchmarks or control points.

1.6 PROJECT RECORD SURVEY

- A. Design-Builder working through the Design-Builder's Surveyor shall perform the following:
1. Upon completion of new foundation walls, prepare and submit a certified survey showing that dimensions, elevations, angles, and location of the building are in accordance with the Contract Documents.
 2. Upon completion of the below grade site work, certify that the Project Record site survey represents the actual dimensions, elevations, lines, grades, and levels, including invert elevations, constructed in the field for all below grade installations and existing services located during the Work referenced to Owner's benchmarks. This shall include the locations of all below grade site improvements including, but not be limited to, civil, electrical and mechanical services, utility tunnels, duct banks and vaults, and irrigation system.
 3. The above documentation shall be submitted to the Owner under provisions of Section 01 77 00 for CAD As-built Shop Drawings.

1.7 PROJECT LAYOUT REQUIREMENTS

- A. The Design-Builder shall be responsible for laying out the Work utilizing recognized engineering survey practices. Establish elevations, grades, lines and levels for:
1. Site improvements, including pavements, walks and retaining walls, stakes for grading, fill and topsoil placement, utility locations including slopes and invert elevations, and irrigation system.
 2. Grid and axis of building structures.
 3. Building foundations, column locations, ground floor elevations, elevations and

levelness for floors and roofs.

4. Other elevations, grades, lines and levels, as needed to properly locate each element of the Project.
- B. Calculate and measure required dimensions as shown within recognized tolerances. Do not scale drawings to determine dimensions.
 - C. Advise entities performing work of marked elevations, grades, lines and levels, provided for their use.

Part 2 - PRODUCTS (Not Used)

Part 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section includes the administrative and procedural requirements for cutting and patching and general alterations of the Project including, but not limited to, preparations, products, transitions and adjustments, and repairs and disposal.
- B. Related Sections:
 - 1. 01 11 01 "Summary of Work – Regulated Materials". To be provided prior to commencement of construction activities.
 - 2. 01 35 23 "Owner's Safety Requirements"
 - 3. 01 71 23 "Field Engineering"

1.2 DESIGN-BUILDER RESPONSIBILITY

- A. The Design-Builder shall bear all cost of correcting damaged or destroyed work, indicated to remain on the Contract Documents, which is caused from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care by the Design-Builder and/or the Subcontractors' work.

1.3 SUBMITTALS

- A. Notice:
 - 1. Submit written request two (2) weeks in advance of cutting or alteration which affects:
 - a. Structural integrity of any element of the Project;
 - b. Integrity of weather-exposed or moisture-resistant elements;
 - c. Efficiency, maintenance, or safety of any operational element;
 - d. Visual qualities of sight exposed elements; and
 - e. Work of Owner or separate contractor.
 - 2. Include in request:
 - a. Project name
 - b. Location and description of affected work
 - c. Description of proposed work
 - d. Reason for cutting or alteration
 - e. Alternatives to cutting and patching
 - f. Effect on work of Owner or separate Design-Builder
 - g. Written permission to affect separate Design-Builder
 - h. Date and time work will be executed, including duration of work
 - i. Utility Shutdown Request form, as appropriate
 - 3. Owner will respond in writing to the submitted request.
- B. Visual Matching: When indicated to "match existing," submit products and/or finishes to match existing adjacent finishes for Owner's review and approval or, for patching new work, use the specified materials and finishes in the Contract Documents.

PART 2 - PRODUCTS

2.1 PATCHING AND EXTENDING WORK

- A. The Design-Builder shall provide products specified in the Contract Documents and/or match existing products with an alternate product of the most suitable grade for the intended purpose.
- B. The Design-Builder shall determine the type and quality of existing products and finishes by inspection and/or testing, where necessary.
 - 1. Remove samples of existing installed work for testing only when approved by Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to commencing work:
 - 1. The Design-Builder shall inspect existing conditions to ascertain elements subject to damage or movement and to determine the need for temporary bracing during cutting and patching work; and
 - 2. Verify that materials to be worked-on or removed have been evaluated in the Owner's Regulated Materials "Good Faith" Survey report.
- B. Beginning of cutting or patching means acceptance of existing conditions.
- C. After cutting and/or removing existing work:
 - 1. The Design-Builder shall inspect conditions affecting performance of new work and notify Owner of any unforeseen physical conditions; and
 - 2. Verify that demolition is complete and areas are ready for installation of new work.

3.2 PREPARATION

- A. Move, or remove, items as necessary for access to cutting and patching work.
- B. For Owner occupied facilities, prepare a noise and vibration control plan in accordance with Section 01 50 00 "Temporary Facilities and Controls."
- C. Schedule shut-downs and obtain permits required for performance of the Work.
- D. Provide temporary supports to ensure structural integrity of the Work.
- E. Provide temporary enclosures, shielding devices and/or other methods to protect the following from damage:
 - 1. Existing conditions that are to remain
 - 2. Owner occupied areas
 - 3. Owner's building systems, including HVAC systems
- F. Establish "hot-works" fire safety precautions required for performance of the Work.

3.3 PERFORMANCE

CUTTING AND PATCHING

- A. Execute cutting and patching work in a manner to:
 - 1. Avoid damage to other work;
 - 2. Provide proper surfaces for installation of new work; and
 - 3. Provide a neat transition from existing finishes to new work.
 - a. Fit new work to existing pipes, sleeves, ducts, conduit and other penetrations through surface
- B. For all new work made to existing work under warranty, employ original installer or fabricator to perform cutting and patching unless otherwise approved by the Owner.
- C. Prepare surfaces to provide for the specified installation of new work and finishes.
 - 1. Remove and replace or repair unsuitable substrate materials (e.g., rotted wood, water damaged materials, corroded metals and deteriorated concrete) for new applications.
- D. Restore existing building systems that are impacted by cutting and patching work to original operating conditions.
- E. For penetrations cut in existing fire-rated separations, completely seal new work with fire-stopping materials to full thickness of the penetrated element.
 - 1. Replace existing fire-stopping materials when disturbed by new work.
- F. Unless otherwise indicated in the Contract Documents, cut concrete and masonry materials using a diamond saw in accurately located straight lines. Pneumatic tools are not allowed without Owner's prior approval.
 - 1. Concrete walls: Core drill pipe penetrations. Saw both sides of wall and break out remainder. Minimize overcuts.
 - 2. Concrete floors: Provide temporary support of elevated floor areas requiring removal and saw-cut. Core-drill pipe penetrations.
 - 3. Masonry walls: Saw-cut along mortar joints. Remove all mortar adhering to edges. Overcuts are not allowed.
 - 4. Wood and/or metal frames walls: Cut wall finish materials in straight uniform lines and remove wall framing as required.
- G. Remove debris and abandoned items from the work area, including from concealed spaces.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes administrative and procedural requirements for construction waste management activities.
- B. Related Sections:
 - 1. 01 50 00 “Temporary Facilities and Controls”

1.2 GOALS AND PROCEDURES

- A. The Owner has established waste management goals for this Project with the minimum requirement of diverting 75% of non-hazardous and non-regulated construction and demolition waste, including recycled or donated materials, by weight in tons, from landfill disposal and/or incinerator.
 - 1. For materials which contain lead or have lead-containing coatings, see Section 01 11 01 “Summary of Work – Regulated Materials,” if applicable.
- B. Waste classified as hazardous materials or dangerous waste will be disposed of by the Owner (see Section 01 11 01 “Summary of Work – Regulated Materials,” if applicable).
 - 1. If the Design-Builder suspects that an unidentified hazardous or dangerous material may exist in the Project area, the Design-Builder shall inform the Owner of this possibility. Owner will investigate and test the material to determine the extent and nature of the material and to decide on appropriate procedures.

1.3 DESIGN-BUILDER RESPONSIBILITY

- A. To the maximum extent possible, the Design-Builder shall separate recyclable materials from construction, demolition, and land clearing waste to be disposed of as garbage.
- B. The Design-Builder shall designate an on-site construction “waste management coordinator” responsible for instructing the Design-Builder’s workers and Subcontractors in the requirements of the construction waste management plan and for overseeing and documenting results.
 - 1. When on-site dumpsters and recycling bins are required by the Contract Documents, the waste management coordinator shall conduct regular visual inspections of dumpsters and recycling bins to ensure materials are being separated properly and to remove contaminants.

1.4 DEFINITIONS

- A. Construction, Demolition, and Land Clearing (CDL) Waste: Includes all non-hazardous solid wastes including material that is recycled, reused, salvaged and/or disposed of as garbage.
- B. Salvage: Recovery of materials for reuse.
- C. Reuse: Making use of a material without altering its form for reuse on-site or reuse on other projects off-site (e.g., grinding of concrete for use as sub-base material and chipping of land clearing debris for use as mulch).

- D. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for use in the manufacture of a new product.
- E. Source-Separated CDL Recycling: The process of providing on-site separation of recyclable materials into separate containers as they are generated. The separated materials are hauled directly to a recycling facility or a transfer station.
- F. Co-mingled CDL Recycling: The collection of mixed recyclable materials in one on-site container. The container is taken to a material recovery facility where materials are separated for recycling.
- G. Material Recovery Facility (MRF): A facility used to sort and recover CDL waste materials for recycling.
- H. Transfer Station: A facility where waste is moved from collection vehicles to larger trucks for longer distance transport to a landfill, source-separated recycling facilities or MRF.
- I. Approved Recycling Facility: A facility that can legally accept CDL waste materials for the purpose of recycling into a new product where the method of recording and calculating the recycling rate is regulated by local or state government.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Divert CDL waste from landfills by one, or by a combination, of the following activities:
 - 1. Salvage
 - 2. Reuse
 - 3. Source-separated CDL recycling
 - 4. Co-mingled CDL recycling
- B. CDL waste materials to be salvaged, reused or recycled include, but are not limited to, the following:
 - 1. Acoustical ceiling tiles
 - 2. Asphalt
 - 3. Asphalt shingles
 - 4. Brick
 - 5. Cardboard
 - 6. Carpet and pad
 - 7. Concrete
 - 8. Drywall
 - 9. Insulation
 - 10. Metals
 - 11. Paint
 - 12. Porcelain
 - 13. Wood
 - 14. Plastic film such as sheeting, shrink wrap, and packaging
 - 15. Window glass
 - 16. Wood
 - 17. Field office waste such as paper, aluminum cans, glass, plastic, and office cardboard

1.6 CONSTRUCTION WASTE MANAGEMENT (CWM) PLAN

- A. Prior to performing any on-site work, the Design-Builder shall develop and submit a CWM plan for Owner's review and comment. The CWM plan shall include a reuse and salvage plan, identification of waste types by quantity and weight in tons, methods of disposal, and handling and transportation procedures. Include separate sections in plan for construction demolition, land clearing debris and construction waste.
- B. The reuse and salvage plan shall include:
 - 1. A list of items being reused in place or elsewhere on the Project;
 - 2. A list of items for reuse off-site through salvage, resale or donation; and
 - 3. A plan for protecting, dismantling, handling, storing and transporting the reused items.
- C. The Design-Builder shall organize the CWM plan to include the following information:
 - 1. Types and estimated quantities, by weight in tons, of CDL waste expected to be generated during demolition and construction.
 - 2. Proposed methods for CDL waste salvage or reuse during demolition including, but not limited to, one or more of the following:
 - a. Contracting with a deconstruction specialist to salvage materials
 - b. Selective salvage as part of the demolition Subcontractor's work
 - c. Reuse of materials on-site, or sale or donation to a third party for reuse
 - 3. Proposed methods for recycling and disposal during construction including, but not limited to, one or more of the following:
 - a. Contracting with a recycling hauler, who accepts commingled construction and demolition debris, for hauling to an approved MRF
 - b. Separating recyclables on-site into containers, for a recycling hauler to haul to a recycler or transfer station
 - c. Separating recyclables on-site into piles or containers, for self-hauling by the Design-Builder or the Design-Builder's Subcontractors to a recycler or transfer station
 - (1) Identify requirements for Subcontractor self-hauling.
 - 4. Name of recycling facility or MRF receiving the CDL wastes.
 - 5. On-site Handling Plan: Proposed locations for collecting CDL waste and/or separating recyclable waste into containers including, but not limited to, types and sizes of containers, and frequency of removal.
 - 6. CWM Communication Procedures: Describe how the CWM plan will be communicated to the Design-Builder's workers and the Design-Builder's Subcontractor's workers (of any tier).

1.7 CONSTRUCTION WASTE MANAGEMENT (CWM) REPORT

- A. CWM Report: The Design-Builder shall submit a cumulative CWM report on an Owner-approved form as a requirement of Final Completion with the following attachments:
1. A record of the type and quantity, by weight in tons, of each material salvaged, reused, recycled or disposed of:
 - a. Dirt and land debris must be documented separately.
 2. Total quantity of waste recycled as a percentage of total waste.
 3. Disposal Receipts: Copy of receipts issued by a disposal facility for CDL waste that is disposed in a landfill.
 4. Recycling Receipts: Copy of receipts issued by an approved recycling facility.
 - a. For co-mingled materials, include weight tickets from the recycling hauler or MRF and verification of the recycling rate for co-mingled loads at the facility.
 5. Salvaged Materials Documentation: Types and quantities, by weight, for materials salvaged for reuse on-site, or sold or donated to a third party.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SOURCE-SEPARATED CDL RECYCLING

- A. Provide containers for separating CDL waste that is to be recycled, clearly labeled with a list of acceptable and unacceptable materials.
- B. For managing on-site stockpiled recyclable materials until removed, stockpile without intermixing with other materials, place and shape to drain surface water, and cover to prevent windblown dust.
1. Stockpile materials away from demolition areas. Do not store within drip line of existing trees.

3.2 CO-MINGLED CDL RECYCLING

- A. Do not put CDL waste that will be disposed of in a landfill into a co-mingled CDL waste recycling container.

3.3 LANDFILL AND/OR INCINERATOR WASTE

- A. Provide containers for CDL waste that is to be disposed of in a landfill or by incineration, clearly labeled as such.

3.4 REMOVAL OF CONSTRUCTION WASTE MATERIALS

- A. Transport CDL waste materials off Owner's property and legally dispose of them.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for Contract closeout including, but not limited to:
 - 1. Project Record
 - 2. Operation and Maintenance Manuals
 - 3. Warranties and Bonds Manual
 - 4. Operating Instructions and Training
 - 5. Cleaning
 - 6. Owner's Final Inspection
 - 7. Substantial Completion
 - 8. Final Completion, and
 - 9. Final Acceptance

1.2 PROJECT RECORD

- A. General: Project Record documents include the Design-Builder's as-built Drawings, as-built Specifications, and as-built Shop Drawings required by the Contract Documents. Project Record documents must be protected from deterioration and stored in a secure fire-resistant location.
- B. As-built Drawings: Maintain black line prints of the bid set Contract Drawings and approved Shop Drawings. Mark the drawings to show new information that was not shown on the bid set Drawings, and on the approved Shop Drawings, including the actual installation where the installation varies substantively from the work as originally shown. Mark drawings to show conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 1. Organize as-built Drawings in manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set.
 - 2. Mark with reproducible pencil and distinguish between variations in separate categories of the Work. Text size is to be 1/8" minimum. Good basic drafting practice must be applied.
 - 3. Show bid addenda items, Change Orders, and Request for Information (RFI) responses by their number, and date the revisions with a "cloud" around the revision.
 - 4. Show mechanical dampers, valves, reheat boxes, cleanouts, and other equipment and items that require maintenance.
 - 5. Show location of construction-concealed mechanical, electrical and plumbing (MEP) riser installations including, but not limited to, piping, ductwork, and conduits referenced to visible and accessible features.
 - 6. Show field changes of dimensions and details.
 - 7. X-out conditions not constructed and appropriately annotate "not constructed" to convey the actual as constructed condition.
- C. As-built Specifications: Maintain one (1) copy of the Specifications showing all addenda, substitutions, Change Orders, and RFIs. Give particular attention to the selection of options,

changes in product data, and information on elements engineered by the Design-Builder and note related as-built Drawing information, as appropriate. Clear, legible documentation must be applied.

- D. As-built Shop Drawings: The Design-Builder shall comply with the following CAD (Computer-Aided Drafting) standards and requirements when preparing as-built record Shop Drawings required by the Contract Documents.
1. Cover sheets shall contain a complete index of all sheets.
 2. Symbols shown must be symbols used in the Contract Documents.
 3. Standard drafting practice shall be:
 - a. Title block
 - (1) All sheets shall have a title block.
 - (2) Title block information is to be on the right side of the sheet.
 - (3) Title blocks shall include the following information:
 - (a) Date
 - (b) University Project Name
 - (c) University Project Number
 - (d) University Facility Number (FACNUM)
 - (e) Sheet name
 - (f) Sheet number
 - (g) Design-Builder or Subcontractor company name
 - (h) Architect/Engineer's Seal (whoever prepared the document)
 - (i) A Key Plan
 - b. Layering format: Use Army Corps of Engineers A/E/C CAD standard found at: <https://cadbim.usace.army.mil/CAD>
 - c. Scale and Units:
 - (1) All objects are to be drawn at full scale for the assigned unit of measure.
 - (2) All drawings are to have a unit of measure assigned and not set to "unitless."
 - d. External references usage in CAD Documents: External references are not allowed for submittals. All external references are to be bound using the "bind" option, instead of the "insert" option.
 - e. Area of Work: CAD drawings shall include a boundary that defines the area of work, showing only the area where work is performed.
 4. CAD Compliance Submittal Review Requirements: CAD Shop Drawings shall be electronically submitted for Owner's CAD compliance review and approval prior to submitting as-built record Shop Drawings. The Design-Builder may request a compliance review at any time during the work prior to Substantial Completion.
 5. Project Record submittal: Provide all record as-built Shop Drawings required by the Contract Documents in CAD and PDF.
 - a. CAD files shall be submitted in latest release of AutoCAD .dwg format.

CLOSEOUT PROCEDURES

- (1) Custom menus or arx applications are not allowed if they create a requirement for the drawing to be used. No menus, custom user interface files or arx applications are to be submitted.
- (2) Each CAD drawing shall represent a single printed sheet where the file name conspicuously identifies the sheet number (e.g. sheet A2.1 CAD file name might be A2-1.dwg).
- (3) For all disciplines in a submittal, the CAD drawings shall be in a single folder. All supporting files (font files, line types, plot configurations, plot style tables, etc.) are to be in a subfolder.

1.3 OPERATIONS AND MAINTENANCE (O&M) MANUALS

- A. The O&M Manuals shall contain all the information needed to operate, maintain and repair all systems, equipment, and product finishes provided in the Project.
- B. Refer to specification section 01 78 23 – “Operation and Maintenance Data” for content, format, and submittal requirements of the O&M documentation including the electronic Operation and Maintenance (eO&M) documents.
- C. The Design-Builder shall maintain the eO&M documentation throughout the construction and turnover phases of the project, up to the Final Completion submission of the O&M required to be provided just prior to final payment request by the Design-Builder. During the closeout phase of the project, the Design-Builder shall make two milestone submittals of the O&M documentation for review and approval. The Contractor shall revise the documentation to incorporate all review comments. The milestone submittals shall be as follows:
 1. Substantial Completion Draft Submittal: This submittal shall be in both print form and electronic form. This submittal will be used as a review set by the Design-Builder, Owner, and Commissioning Authority to ensure that the Design-Builder has prepared the documentation to be in compliance with the requirements of section 01 78 23 – “Operation and Maintenance Data” and is complete except for items that cannot yet be completed at the time of Substantial Completion for the project such as ongoing as-built drawings, etc. However, all documentation required by the Design-Builder shall still be included in this review set, in their present state, even if they are not yet completed.
 2. Final Completion Record Set Submittal: This submittal shall be in both print form and electronic form. This submittal shall be fully completed. The Contractor shall use the Substantial Completion Draft submittal (electronic and printed versions) as the basis and update it for the Final Completion Submittal. The Design-Builder shall clearly indicate what has changed from the Substantial Completion Draft Submittal. The documents will be reviewed by the Design-Builder, Owner, and Commissioning Authority for full compliance with the requirements of section 01 78 23.
- D. The Design-Builder shall use eO&M version of the documents, in their current state, as a presentation reference for the demonstration and training activities. The Design-Builder shall ensure that the eO&M documentation is complete for the materials presented at each training session that are associated with that session.

1.4 WARRANTIES AND BONDS MANUAL

- A. Assemble executed warranties and bonds, and any certificates from the respective manufacturers, suppliers, and Subcontractors. Provide preliminary review copies of all warranties and bonds and a final manual with the original documents, titled “Warranties and

Bonds Manual.” Manuals shall be assembled in the same format as the O&M Manuals and include a table of contents in complete and orderly sequence.

1.5 DEMONSTRATION AND TRAINING

- A. The Contractor shall provide on-site instruction, demonstration, and training for Owner's personnel in all aspects of the philosophy, operation and maintenance of equipment and systems. Demonstration and training shall be provided by a qualified trainer from the Contractor or Subcontractor who supplied and installed the equipment and/or systems or a manufacturer's training representative who is familiar with all aspects of the design, operation, maintenance, and troubleshooting of the specified equipment and systems. Training shall be conducted in a classroom setting with appropriate schematics, handouts, and audio/visual aids, as well as the most current documentation from the eO&M relating to the training topic. All training shall be digitally recorded in video. Attendance shall be recorded. For work requiring commissioning, see Section 01 91 00 “General Commissioning Requirements” for further training session agenda requirements.

Refer to specification section 01 79 00 – “Demonstration and Training” for requirements relating to preparation of the Owner Training Plan, the types of training to be performed, training agenda submittals, training schedule, and training content and format.

1.6 CLEANING

- A. Design-Builder clean up during construction is specified in the Contract Documents.
1. If Design-Builder fails to clean as specified in the Contract Documents, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Design-Builder.
 2. Design-Builder shall employ continuous housekeeping cleaning during construction to minimize interior construction dust and particulates during the Work.
- A. Preliminary Cleaning: Perform the following preliminary cleaning operations as a prerequisite for Owner's Final Inspection. The following are examples, without limitation, of minimum cleaning requirements:
1. Remove labels that are not permanent.
 2. Remove temporary protective coatings and wrappings from all products.
 3. Remove glazing compounds and other vision obscuring substances from transparent and reflective materials provided by the Design-Builder including, but not limited to, mirrors, glass in doors and interior construction, glass canopies and skylights, and windows inside and out.
 4. Clean all exposed building interior surfaces, including cabinet interiors, and new exterior surfaces to be free of foreign substances including, but not limited to, stains and films.
 5. Leave floors broom-clean. Vacuum carpeted surfaces and clean consistent with manufacturer's recommendations for installation.
 6. Remove and clean all construction debris and refuse from:
 - a. Roofs, mechanical and electrical rooms, tunnels and equipment vaults
 - b. Limited access spaces, including above ceiling areas and shafts
 - c. Physically inaccessible components of the Work including wall and chase cavities, gutters and downspouts, floor drains and other drainage systems

CLOSEOUT PROCEDURES

7. Wipe surfaces of M&E equipment, including elevator equipment and similar Architectural equipment. Remove excess lubrication and other substances.
 8. Clean the Project site of construction waste, rubbish, and litter. Sweep paved areas broom clean and remove stains, spills, and other foreign deposits.
- B. Final Cleaning: Prior to Substantial Completion, employ experienced workers or professional cleaners for final cleaning of the Work. Clean to a condition expected of a normal commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
1. Leave entire Project clean and ready for occupancy. All new interior, including cabinet interiors, and exterior building surfaces, fixtures and equipment shall be turned over to the Owner in a new condition, free of all damage, dust, dirt, spots, stains, encrustations, and other blemishes.
 2. Clean transparent materials including mirrors, glass in doors and interior construction, glass canopies and skylights, and windows inside and out.
 3. Clean plumbing fixtures to a sanitary condition.
 4. Clean light fixtures and lamps.
- C. Compliance: The Design-Builder shall:
1. Use non-toxic Green Seal Certified cleaning products, or products with low-volatile organic compounds (VOC), and cleaning paper with a post-consumer recycled content;
 2. Employ equipment with high efficiency particulate filtration and sweep compound to keep dust down; and
 3. Comply with current regulations and standards of authorities having jurisdiction and the safety standards for cleaning specified in the manufacturer's instructions.

1.7 OWNER'S FINAL INSPECTION

- A. Prior to Final Inspection: The Design-Builder shall satisfactorily complete the following actions prior to the Owner's final inspection of the Project.
1. Submit written notice that the Project is ready for final inspection. Include a copy of the Design-Builder's final punch list report and list all incomplete work items that have been reviewed with the Owner, and which the Owner has agreed are not necessary prior to Substantial Completion.
 - a. Include: a written plan/schedule outlining all actions necessary to achieve Substantial Completion, without requiring extra ordinary participation by Owner.
 2. Complete preliminary cleaning operations.
 3. Submit a list of all equipment and systems requiring instruction and training with a proposed schedule of times and locations for the instruction, for Owner's review and comment.
 4. Replace all ventilation systems air filters specified for construction with final filters.

5. Complete start up and functional performance testing of all systems required by the Contract Documents and AHJ including, but not limited to: electrical testing; environmental control systems point-to-point testing; and HVAC air balancing (if included in the scope of the Work).
 6. Submit one (1) hard copy each of the current air balancing report and the M&E Commissioning Binders labeled "Preliminary," listing all deficiencies, for Owner's review and comment.
 7. Submit the final copper and fiber optic communications cabling test results in PDF format, on Owner's CMS.
 8. Submit the final audio/visual equipment documentation including, but not limited to, manufacturer/model information and an itemized summary list with equipment serial numbers in PDF format, on Owner's CMS.
- B. Owner's Final Inspection: Upon satisfactory completion of the actions in 1.7A, Owner will determine if the Project is complete and ready for final inspection and, at Owner's sole discretion, commence final inspection, or provide a written deficiency list of items to the Design-Builder of work that must be completed to the satisfaction of the Owner prior to the Owner's final inspection. Final inspection is performed by the Owner.
1. After the Owner has issued the final inspection list of corrective work items, the Design-Builder shall make the required corrections and/or identify items that the Design-Builder feels are not required by the Contract Documents, and resolve these items with the Owner.
- C. Re-inspection: Design-Builder shall request, in writing, re-inspection after completing the Owner's final inspection list of corrective work items and providing the Owner the final inspection report notated with a signed-off approval for each of the corrected items. Those items whose completion is delayed due to circumstances acceptable to the Owner will be exceptions. The Owner's Representative will back check the items.
1. If the Owner is required to perform more than one re-inspection, the costs for additional inspections may be borne by the Design-Builder, at the Owner's sole discretion.

1.8 SUBSTANTIAL COMPLETION

- A. Substantial Completion: Substantial Completion (for either the entire Work or portions thereof) shall be achieved when all Work, other than incidental corrective and incidental punch list work, is complete including, but not limited to, the following actions:
1. Complete final cleaning operations.
 2. Submit the "Preliminary" Operations and Maintenance Manual for Owner's review and comment in one (1) hard copy and in PDF format, on Owner's CMS.
 3. Submit all sign-offs, releases, jurisdictional settlements, judgments, and other records from AHJ allowing the Owner's full and unrestricted use and benefit of the facilities including, but not limited to, a temporary or permanent certificate of occupancy permit, operating permits and/or licenses for the use of building equipment such as elevators, boilers, paint booths, etc. and similar necessary certificates and releases.
 - a. Provide a list of any outstanding work required by AHJ.

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4. Submit the current Project Record as-built Drawings and Specifications identified "Preliminary" Project Record (marked with the date of submission) in PDF format, on Owner's CMS.
 5. Submit the Project Record as-built Shop Drawings required by the Contract Documents.
 6. Remove all construction tools and temporary facilities not required for Final Completion work from the Project site including, but not limited to, storage sheds, samples and mock-ups, Project identification signage, site fences, crane and hoist base foundation construction, temporary enclosures, and construction electrical power and service.
 7. Complete Owner's personnel operating instructions and training and submit training DVD's.
 8. Deliver specified maintenance equipment and tools to Owner, with itemized summary list.
 9. Complete final change-over of locks, transmit new keys to Owner, and return Owner's loaned construction keys.
 10. Complete all air balancing, testing and commissioning work required by the Contract Documents, allowing the Owner to fully occupy the Work for the use for which it is intended. Incidental Work, that is not life safety or occupational safety commissioning work, whose completion is delayed due to circumstances excused by the Owner, will be the exception.
 - a. Submit one (1) hard copy each of the current air balancing report and M&E Commissioning Binders (marked with the date of submission) noting the corrections for deficiencies listed in the "Preliminary" report and binders and indicating any incomplete Work.
 11. Submit all controls systems software files required by the Contract Documents including, but not limited to, lighting and environmental controls.
 12. Submit one (1) hard copy of the current Build It LEED Toolkit ® with all LEED documentation labeled "Preliminary," for Owner's review and comment.
- B. Substantial Completion: Upon a satisfactory completion of the actions in 1.8A above and the requirements for Substantial Completion set forth in the Contract Documents, the Owner will prepare a letter of Substantial Completion and forward to Design-Builder. The letter will identify the date of Substantial Completion and include the final punch list report, listing all remaining incomplete work. Contract warranties will begin as of the date of Substantial Completion, as specified in Section 01 78 36 "Warranties," or as otherwise indicated in the Contract Documents.
1. Substantial Completion and the start of warranties for incomplete items will be established in writing by the Owner when the item is determined complete.

1.9 FINAL COMPLETION

- A. Prior to Final Completion: Final Completion shall be achieved when the Work is fully and finally complete, to the Owner's satisfaction in accordance with the Contract Documents including, but not limited to, the following:

1. All Work, including incidental corrective or punch list work, and air balancing and commissioning work (if included in the scope of the Work) is complete and correct to the satisfaction of the Owner.
 2. All remaining temporary facilities are removed from the Project site and the site is restored to original conditions or Contract Documents requirements.
 3. All final permits, originally issued as temporary permits, have been submitted.
 4. The final marked-up Project Record as-built Drawings and Specifications identified Final Project Record (marked with the date of submission) have been submitted in hard copy; and in PDF format.
 5. The complete Operations and Maintenance Manual and Warranties and Bonds Manuals have been submitted in PDF format, and a hard copy of the Warranties and Bonds Manual with original documents has been submitted.
 6. The Design-Builder's final 3-ring binder of all MSDS used for construction, marked with the date of submission, has been submitted in PDF format.
 7. The Design-Builder's final cumulative Construction Waste Management Report (marked with the date of submission) has been submitted in PDF format.
 8. All Change Orders are approved and signed by both parties.
 9. A draft of the Final Application for Payment has been submitted to Owner for review and approval.
 10. The final Schedule of Values and the Building Componentization Report in hard and electronic copies (see Section 01 29 76 "Progress Payment Procedures") have been submitted.
 11. The final air balancing report and the final M&E Commissioning Binders (marked with the date of submission) have been submitted in PDF format, on Owner's CMS.
 12. The software file used to calculate the power systems studies (Power Tools – SKM®) has been submitted.
 13. Specified spare parts, extra stock of materials, and extra materials of value to the Owner, with itemized summary list, have been submitted.
 14. The "Regulated Materials – Waste Manifests" (marked with date of submission) have been submitted in PDF format, on Owner's CMS.
 15. All required USGBC LEED certification on-line forms are submitted and the final Build It LEED Toolkit ® with all final LEED documentation including the LEED estimated construction costs have been submitted in PDF format, on Owner's CMS
- B. Final Completion: Upon satisfactory completion of the requirements in 1.9A above to achieve Final Completion, the Owner will approve and process the final Application for Payment and establish the date of Final Completion thereon.

1.10 FINAL ACCEPTANCE

- A. Final Application for Payment has been approved by Owner and payment made to the Design-Builder.

- B. The Owner will establish the date of Final Acceptance and issue the letter of Final Acceptance after the Design-Builder has completed the requirements of the Contract Documents.
 - 1. The Design-Builder shall follow the requirements outlined in the Contract Documents and Section 01 29 76 "Progress Payment Procedures" for release of retainage.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. Description: This section includes administrative and procedural requirements for providing operation and maintenance (O&M) documentation, including the following:
 - 1. Schedule of deliverables and timeline for O&M documentation,
 - 2. Deliverable format for the documentation,
 - 3. Scope of content for the O&M documentation.
- B. Related Sections:
 - 1. Section 01 32 16 - Construction Progress Schedule
 - 2. Section 01 33 00 - Submittal Procedures
 - 3. Section 01 33 00.11 – Submittal Standards Requirements and Compliance Review
 - 4. Section 01 77 00 - Closeout Procedures
 - 5. Section 01 78 23.11 – Facilities Management Data Requirement for O&M
 - 6. Section 01 78 36 - Warranties
 - 7. Section 01 91 00 - General Commissioning Requirements

1.2 DOCUMENTATION SUBMITTALS TIMELINE

- A. General:
 - 1. The operation and maintenance (O&M) documentation, including print and electronic versions, shall be submitted at defined milestones of the construction and turn-over phases for the project, as described in this specification section. At each milestone, the Design-Builder shall submit the document for review and approval by the Owner and Commissioning Authority (CxA).
 - 2. During the construction phase and acceptance phase of the project, and between the milestone submissions, the Design-Builder shall also maintain a separate, periodically-updated electronic Operation and Maintenance (eO&M) version of the documentation, hosted on the Owner's internet-based website for the project, for the purpose of keeping a current and accurate version, accessible by the Design-Builder, Consultants, and Owner throughout the construction and turn-over phases of the project.
- B. Milestone Submittals Timeline:
 - 1. eO&M Formatting Review Draft Submittal: The Design-Builder shall submit this document, in electronic format only, prior to starting the product and shop drawing submittal process in order to establish that the organization and formatting of the eO&M pdf document meets the requirements of the University of Washington standards for eO&Ms.
 - 2. Initial Review Draft Submittal: The Design-Builder shall submit this milestone document, in electronic format only, within 30 days after the product and shop drawing submittals have been substantially approved, as determined by the Owner's Construction Manager.
 - 3. Substantial Completion Draft Submittal: The Design-Builder shall submit this document, in both print and electronic format, 2 weeks prior to the Substantial Completion date.

4. Final Completion Record Set Submittal: The Design-Builder shall submit this document, in both print and electronic format, 2 weeks prior to final payment request.

PART 2 - PRODUCTS

2.1 DOCUMENTATION FORMAT

A. Electronic Files Requirements:

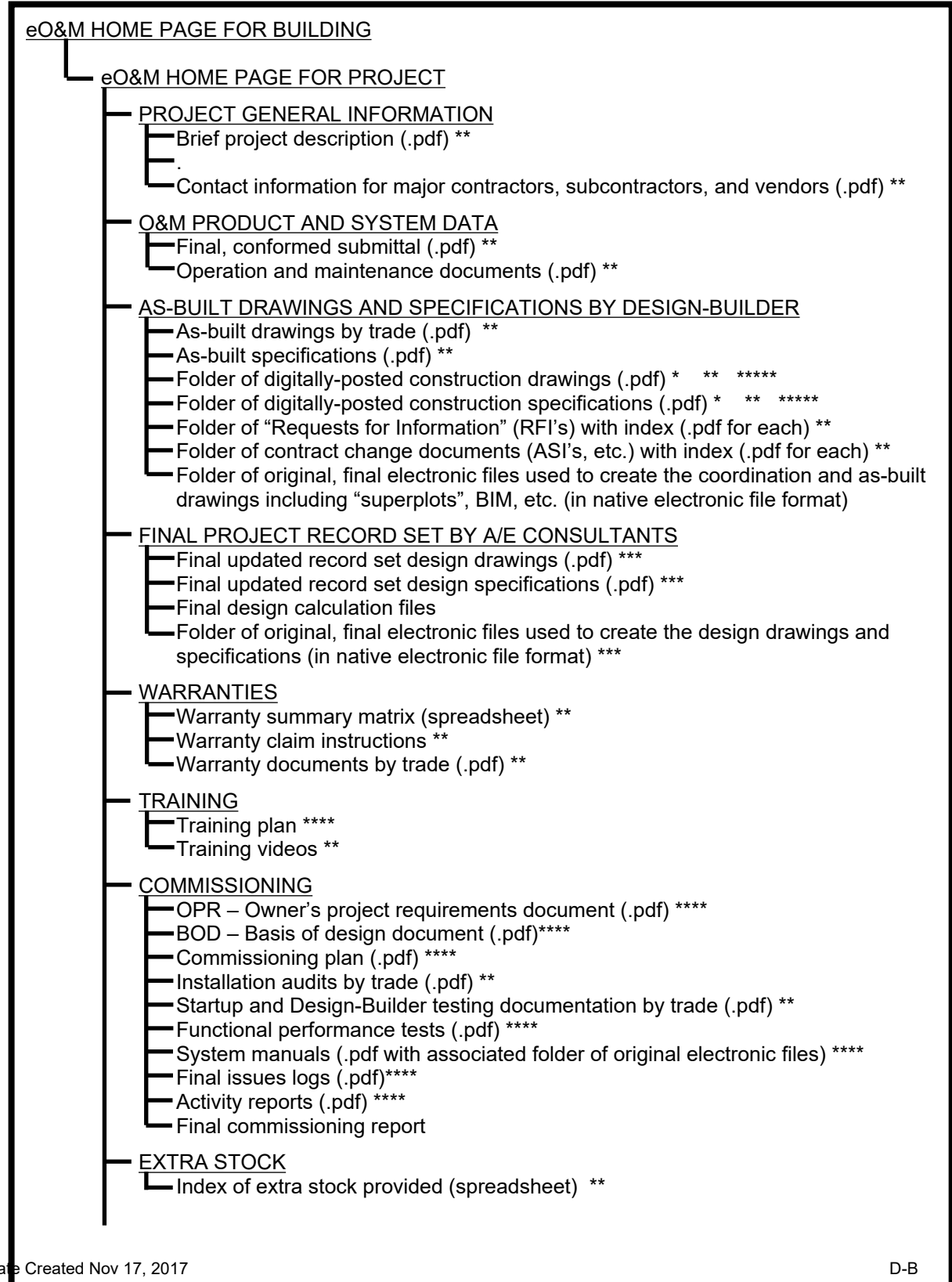
1. Electronic files provided by the Design-Builder shall comply with the requirements in Section 01 33 00.11 – “Submittal Standards Requirements and Compliance Review Exhibit”.

B. Electronic Operation and Maintenance (eO&M) Documentation:

1. The Owner will transmit to the Design-Builder an electronic set of files containing the “skeleton” for the electronic Operation and Maintenance documentation (eO&M). The purpose of these files is to give the Design-Builder a starting point to develop the eO&M's as well as to provide a consistent product and user interface experience from project to project for the Owner. The Design-Builder shall edit this document to fill in the project-specific data, information, and documentation to produce a complete eO&M document.
2. The basic eO&M document shall consist of a single pdf file that is embedded with “hyperlinks” to provide an overall document that can be navigated by the user in order to quickly find the desired information in an intuitive manner. The hyperlinks may bring up a pre-defined view of the eO&M pdf document or open a file, a folder, or video training file, etc.
3. The document shall have a home page as well as subpages for each major section of the document. Each page shall include an “active” table of contents that is built from hyperlinks to open and view the associated documentation or linked file(s) by clicking on the hyper-linked item within the table of contents.
4. Each page shall include navigation buttons to allow the user to navigate up and down the directory structure of the document. A home page navigation button shall also be included on each page.
5. The files for the documentation and the eO&M navigation pages shall be organized in a file folder directory similar to the hierarchal arrangement of the navigation structure of the eO&M pdf document.
6. The Design-Builder shall fill in the file folders with the technical contents (electronic files), create the table of contents on each pdf page (for O&M, As-Built, Startup/Test, Warranties, and Training eO&M pages), and create the table of contents' hyperlinks such that the hyperlinks open the correct electronic files in order to complete the organization and navigation functions of the document.
7. All hyperlinks shall be the “relative” type. “Absolute” type hyperlinks shall not be allowed. The “relative” type hyperlinks shall allow the eO&M pdf document and its associated subfolders and electronic files to be copied and transferred to different hosting media while maintaining the full functionality of the hyperlinks.

8. The eO&M navigation and directory structure shall be organized per Diagram 1 below:

Diagram 1 – eO&M Navigation and Directory Tree Structure (Skeleton):



MISCELLANEOUS

- * These drawings shall contain embedded hyperlinks to automatically open the associated RFI's, ASI's, etc. files that they reference.
- ** These files shall be provided by the Design-Builder.
- *** These files shall be provided by the A/E designers.
- **** These files shall be provided by the Commissioning Authority.
- ***** Create these drawings in a subfolder structure that can be imported to the eO&M while still retaining the integrity of the "relative hyperlinks".

C. Electronic File Naming Conventions:

1. The electronic files that are linked to in the eO&M documents shall be named in a manner consistent with the University of Washington standard file naming convention for O&M documentation as indicated below.
2. The name of the electronic file shall include the following components so that it can be identified consistently.

Example: +xxxxx***XXXXXX------.pdf

Character 1 (+) refers to the campus location:

S refers to Seattle
B refers to Bothell
T refers to Tacoma

Characters 2 through 6 (xxxxx) refer to the five digit U.W. building facility number. Coordinate with the U.W. Construction Manager to obtain the building number for the project. If the building number is less than five characters, insert zero characters proceeding the building number until it is five characters long.

Characters 7 to 9 (***) refer to the type of documentation as follows:

INF refers to the general information section.
ONM refers to the O&M documentation section.
ASB refers to the Design-Builder's as-build documentation section.
REC refers to the designer's record set section.
WAR refers to the warranties section.
TRN refers to the training section.
CX_ refers to the commissioning section.
EXS refers to the extra stock section.
MSC refers to the miscellaneous section.

Characters 10 through 15 (XXXXXX) refer to the six digit specification number. This should follow the specification section numbering system for the project.

Characters 16 through 35 (-----) can be used by the Design-Builder to better describe the content in a shorthand manner (i.e. – "VFD", "HVAC_Flr1_Plan", "Int_Lighting", etc.). The Design-Builder shall limit the length of this section to 20 characters. Note that this section will also serve to differentiate three subcategories as follows:

For Submittal files that are contained within the ONM section, characters 16 to 35 shall begin with their first 3 characters designated as "SUB".
For Installation Audit files that are contained within the CX_ section, characters 16 to 35 shall begin with their first 3 characters designated as "INS".
For Startup/Test Report files that are contained within the CX_ section, characters 16 to 35 shall begin with their first 3 characters designated as "RPT".

D. Print Media Documentation:

1. In addition to the electronic submittals, the Design-Builder shall also submit one (1) hard (printed) copy of the O&M documentation for the Substantial Draft Submittal and the Final Completion Record Set Submittal reviews.
2. Operation and Maintenance Manual Documentation:
 - a. The printed documentation shall be submitted as a collection of 3-ring binders as well as separate As-Built drawing sets organized according to the following three main disciplines:
 - 1) Architectural
 - 2) Mechanical
 - 3) Electrical
 - b. Binders shall be extra heavy duty type slant-D, 3-ring binder with clear vinyl overlay to insert front, spine, and back covers.
 - c. Provide a cover slip sheet and a spine sheet typed with ARCHITECTURAL/SITE, MECHANICAL, and/or ELECTRICAL – OPERATIONS AND MAINTENANCE MANUAL, University project name, University project number, University facility number, and Design-Builder name. Label manuals consecutively for each discipline. Each manual shall have a typed index and tabbed dividers between chapters and sections. Where more than one piece of equipment is included within a chapter, the Design-Builder shall use slip sheets or sub-dividers to separate the pieces of equipment. Sub-dividers must be approved by the Owner to demonstrate an orderly and clear organization of dividers.
 - d. Contents of the manual shall be printed on white 8-1/2"x11" acid-free, recycled paper. If 11"x17" sheets are included, the Design-Builder shall fold them to fit within the space of an 8-1/2"x11" page for consistency. If larger sheets are included, the Design-Builder shall include 3-ring binder sleeves so that the larger sheets can be folded to fit within the binder and be secured.
 - e. The documentation for each major discipline may require the use of more than one 3-ring binder.
3. The print media documentation shall only include the O&M section materials, including the same submittal information as well as manufacturer's operation & maintenance / instructions documentation that is contained in the O&M section of the eO&M.

2.2 DOCUMENTATION CONTENT**A. Electronic Files Requirements:**

1. Electronic files provided by the Design-Builder shall comply with the requirements in Section 01 33 00.11 – "Submittal Standards Requirements and Compliance Review Exhibit".

B. Non-Duplication of Content:

1. The Design-Builder shall not duplicate document content in more than one location within the eO&M in order to ensure that correct version control can be maintained. For example, if a shop drawing is provided as part of a Submittal document, and included within the O&M section, the Design-Builder shall not provide that same shop drawing within the As-Built section, but shall instead include a reference note within the as-built drawing section that points the user to look in the O&M section for that document.

C. O&M Section Content:

For all of the final submittal documents, the Design-Builder shall include the following documentation when they exist:

1. Final Approved Submittal: Include the manufacturer's product brochure and technical literature assembled specifically for the project and excluding irrelevant materials, as well as providing the final, approved submittal.
 - a. Each product data sheet shall be clearly marked to identify the specific products and components used in the installation and the data applicable.
 - b. Mark the header of the documents with the identification tag indicated on the design drawings or specifications.
 - c. Provide additional instructions and illustrations as required to identify any changes to the manufacturer's data or to illustrate the function of each component in the installation.
 - d. Include performance, ratings, and engineering data for the equipment.
 - e. Include a brief description of how the equipment operates as well as a detailed sequence of operation.
 - f. Include controls diagrams where applicable.
 - g. When there is more than one submission/review for a particular submittal, the Design-Builder shall consolidate the submittals such that the Final, Approved Submittal included in the eO&M is just one comprehensive submittal that shows the final and complete version of the submittal.
2. Installation Instructions: Include a copy of the manufacturer's installation instructions specific to the provided equipment and marked-up to indicate options provided or crossed-out where the documentation materials do not apply.
3. Operation and Maintenance Instructions: Include a copy of the manufacturer's operation and maintenance instructions for the equipment as well as notes provided by the Design-Builder or Vendor that would assist the Owner in the future maintenance or operation of the equipment. The Design-Builder shall mark up the operation and maintenance materials to indicate which options have been provided for the project and strike out portions of the materials that do not apply to the specific equipment provided. The documentation shall include the following information:
 - a. Safety precautions,
 - b. Equipment or system break-in procedures,
 - c. Startup procedures,
 - d. Routine and normal operating instructions,
 - e. Normal shutdown instructions,
 - f. Emergency shutdown instructions,
 - g. Seasonal operating instructions,
 - h. Troubleshooting procedures,
 - i. Required sequences for electric or electronic systems,
 - j. Special operating instructions and procedures,
 - k. Schedules of the parameter settings for each protective device, including fixed and adjustable circuit breakers, protective relays, adjustable photoelectric switches, pressure switches, and any other control and monitoring device, as established during commissioning and construction maintenance periods,
 - l. A listing of maintenance tasks to be performed,
 - m. Step-by-step instructions for each maintenance task,
 - n. Recommendations for scheduled intervals for performing each maintenance tasks.

4. Parts Identification: Identification of each component, including exploded view diagrams and a complete parts list.
5. Tools and Testing Instrumentation: Provide a list of special tools and testing instrumentation necessary for maintenance and testing of the equipment as well as detailed instructions for their use, if provided for the project.
6. Spares and Consumables: Provide a recommended schedule of spares (including bearings when the expected operating life less than 40,000 hours), and a schedule of recommended consumable items to be used during servicing.
7. Wiring Diagrams: Provide a copy of the actual wiring diagram shipped with the equipment. Generic wiring diagrams included with the manufacturer's standard O&M documentation shall not be acceptable.
8. Performance Charts: Provide a copy of any performance charts or criteria associated with the equipment including fan curves, minimum/maximum operating conditions, etc.
9. Operating Logs: Where operating logs are required to be kept during the time period when the Design-Builder is operating the equipment, include those logs.
10. Special System Information: The following special information shall also be included:
 - a. As-built door hardware schedule and submittal documentation.
 - b. Elevator systems documentation including wiring/equipment locations diagrams.
 - c. Refrigeration controls schematics / sequence of operation documentation.
 - d. Motors data and variable frequency drives (VFDs) documentation including final settings programmed into the VFDs.
 - e. Fan and pump curves documentation.
 - f. HVAC filters schedules.
 - g. Environmental controls systems (ECS) documentation including hardware and software manuals.
 - h. Electrical short circuit coordination and arc flash study report.
 - i. Pull calculations for MV wire, cable, and terminations.
 - j. Electrical transformer factory testing reports.
11. Product Materials Maintenance Documentation: Where architectural product materials are included in the submittal, the Design-Builder shall provide the following information:
 - a. Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, and repair materials as described below.
 - b. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
 - c. Product Information: Include the following, as applicable:
 - 1) Product name and model number.
 - 2) Manufacturer's name.
 - 3) Color, pattern, and texture.
 - 4) Material and chemical composition.
 - 5) Reordering information for specially manufactured products.

- 6) Maintenance Procedures: Include manufacturer's written recommendations and the following:
- 7) Inspection procedures.
- 8) Types of cleaning agents to be used and methods of cleaning.
- 9) List of cleaning agents and methods of cleaning detrimental to product.
- 10) Schedule for routine cleaning and maintenance.
- 11) Repair instructions.

D. As-Built Drawings Content

1. Refer to specification section 01 77 00 – “Closeout Procedures” for requirements relating to formatting and content of the Design-Builder’s As-Built drawings and specifications.
2. The Design-Builder shall revise the as-built drawings and specifications to reflect the most current state of the installed conditions and submit those documents within the eO&M.
3. It is expected that the various Subcontractors and Vendors will produce as-built drawings using different methods. Some may produce them from BIM models, or from AutoCad drawings, or from proprietary software, or from red-line mark-ups of design set hard copy drawings. However, the end product to be included in this eO&M shall be sets of .pdf documents.
4. The as-built drawings shall consist of all Design-Builder -produced drawings and details used for the purpose of detailing the dimensionally-correct “as-installed” representation of the final construction as well as any Design-Builder -produced documents of Design-Builder -performed design/engineering documents required to complete the construction. Examples of as-built drawings include, but are not limited to:
 - a. A pdf floor plan of the HVAC ductwork layout, prepared by the Mechanical Subcontractor, that includes the dimensions of the actual installed construction with ductwork specialties included represented in a dimensionally-correct manner,
 - b. A pdf detail drawing of a shop drawing, prepared by the Mechanical Contractor, used to show the dimensions of a structural skid used for a shop-fabricated pump skid base,
 - c. A marked-up red-lined drawing on a hard copy of an architectural design drawing print, prepared by an Architectural Vendor, that is then scanned into a pdf electronic file,
 - d. An engineered shop drawing package, prepared by the Building Automation System controls vendor, that includes the vendor-performed engineering drawings, calculations, and details, etc. required to describe their bill of materials, how their system will be constructed, wired together, programmed, sequenced, etc., all in pdf format,
 - e. An engineered shop drawing package, prepared by the Fire Alarm vendor, that includes the vendor-performed engineering drawings, calculations, and details, etc. required to describe their bill of materials, how their system will be constructed, wired together, programmed, sequenced, etc., as well as shows the actual devices provided and where they are located on the floor plans, etc., all in pdf format.

5. As-built drawings and specifications shall be scanned and uploaded once a month for review as part of the request for payment process. The as-built file shall be submitted in a format that is accessible and readable by the Owner and CxA.

E. Startup/Test Report Documentation Content

1. Upon completion of a test or startup activity, the Design-Builder shall upload the supporting documentation to the web-hosted eO&M documentation within 2 weeks of completing that activity.
2. The Design-Builder shall notify the Owner, by transmittal, when each startup documentation and test report is uploaded to facilitate timely review of the documentation by the A/E, Owner, and CxA.
3. The Design-Builder shall organize the test reports and startup documentation by discipline and then by system and then equipment.
4. The required startup documentation for the project is defined in other sections of these specifications, including the commissioning sections.

F. Warranty Section Content

1. Include the complete warranty and bond documentation in the Initial Review Draft submittal.
2. Refer to section 01 78 36 – “Warranties” for the scope of content to be included for warranty documentation.
3. Organize the warranty information by discipline (building trade) and then, if needed, by system and then by equipment.

G. Training Section Content:

1. Include the completed training plan.
2. Include all training videos in the highest quality “.mp4” electronic file format. For videos that the Design-Builder has obtained from the manufacturer, include the written permission documents from the manufacturer stating that the manufacturer grants the Owner use of the video files for their use.
3. If the electronic files are greater than 2 gigabytes in size, break the video into multiple parts.

H. Commissioning Content:

1. The Commissioning Authority will provide the documentation under this section except for the Installation Audit and Startup/Test Report sections that are required to be completed by the Design-Builder.

I. Extra Stock Content:

1. Include a summary spreadsheet of all of the extra stock required and provided for the project.

2. Each line item shall include the specification reference, the actual products provided (including manufacturer, model numbers, etc.), the quantity provided, and where the stock was left on site (or at the agreed upon location), at the end of the project.
 3. Include a picture of the extra stock at the locations where they were left at the end of the project.
- J. Miscellaneous Content:
1. The content of this section may vary by project. This section is intended to allow for additional documentation to be stored, as needed by the project or as desired by the Owner.

PART 3 - EXECUTION

3.1 MILESTONE SUBMITTAL: eO&M FORMATTING REVIEW DRAFT:

- A. This submittal shall be electronic only. The Design-BUILDER shall submit (2) electronic copies on USB drive media and shall also upload the electronic files to the internet-based hosting website utilized by the Owner for the project.
- B. The purpose of this submittal is for the Design-BUILDER to develop the eO&M formatting and file directory structures so that the organization can be reviewed and approved by the Owner, and (CxA). The Design-BUILDER shall comply with all Owner requirements for formatting and naming conventions, organization, navigation, and content.
- C. The Design-BUILDER shall not be required to provide the technical O&M information for this submittal. Only the organization, formatting, navigation, and project general information section will be reviewed.
- D. For this submittal, the Design-BUILDER shall edit the "skeleton" eO&M, provided by the Owner, and complete the following tasks:
 1. The Design-BUILDER shall prepare the "index" of hyperlinked documents on each of the applicable eO&M page for the documents that they are required to provide within the eO&M. Each index shall be a comprehensive listing of all the documents to be provided for that eO&M page and shall describe clearly and intuitively what the document is. The hyperlinks for the index do not need to be created for this review submittal. The purpose of this requirement is for the Design-BUILDER to demonstrate how they will be organizing the documents as well as demonstrate to the Owner that the documentation will be comprehensive. The Design-BUILDER shall be responsible for ensuring that all required documentation is included.
 2. Project Home Page: The Design-BUILDER shall filled in and completed with all of the project-specific information.
 3. Project General Information Section: The Design-BUILDER shall project general information page shall be fully completed including the project description document and the two contacts documents.

4. O&M Section: The Design-Builder shall create the "index" (list of hyperlinked documents) on each of the individual trade pages in this section. The hyperlinks associated with the line items in each index do not need to be created for this submittal.
5. As-Built Drawings and Specifications Section: The Design-Builder shall create the "index" (list of hyperlinked documents) on each of the individual trade pages in this section. The hyperlinks associated with the line items in each index do not need to be created for this submittal.
6. Test Reports and Startup Documentation Section: The Design-Builder shall create the "index" (list of hyperlinked documents) on each of the individual trade pages in this section. The hyperlinks associated with the line items in each index do not need to be created for this submittal.
7. Warranties Section: The Design-Builder shall create the "index" (list of hyperlinked documents) on each of the individual trade pages in this section. The hyperlinks associated with the line items in each index do not need to be created for this submittal. The Design-Builder shall also fully complete the Warranties Summary Matrix Document and produce the "Warranty Claim Initiation Instructions" document.
8. Training Section: The Design-Builder shall create the "index" (list of hyperlinked documents – video files and other training documents) on each of the individual trade pages in this section. The hyperlinks associated with the line items in each index do not need to be created for this submittal.
9. Commissioning Section: The Design-Builder shall create the "index" (list of hyperlinked documents on each of the individual trade pages for the Installation Audit and Startup/Test Reports subsections. The hyperlinks associated with the line items in each index do not need to be created for this submittal.

3.2 MILESTONE SUBMITTAL: INITIAL REVIEW DRAFT SUBMITTAL AND PERIODIC UPDATES:

- A. This submittal shall be in electronic media format only. The Design-Builder shall submit two (2) electronic copies on USB drive media and shall also upload the electronic files to the internet-based hosting website utilized by the Owner for the project.
- B. The purpose of this submittal is to conduct an initial review of the technical content provided by the Design-Builder. For this submittal, the Design-Builder shall provide all final Submittal and O&M/Instructions. The As-Built Drawings, Installation Audits, Startup/Test Reports Documentation, and Training Videos will not be required for the Initial Review Draft Submittal but shall be required for the subsequent periodic update reviews required for payment applications by the Design-Builder.
- C. The content files shall be hyperlinked to the associated index line item in the O&M section, utilizing "relative hyperlinks".
- D. eO&M Periodic Updates: After the Initial Review Draft has been reviewed and approved by the Owner and CxA, the Design-Builder shall continuously update the electronic version that is hosted on the project internet-based web site. The Design-Builder shall update all documentation that is affected by changes to the project scope of work and also as progress is made or activities completed for As-Built Drawings, Test Reports/Startup Documentation and Training Videos. The Design-Builder shall update the documentation as soon as possible, including completing and testing the navigation hyperlinks for the added materials.

The Owner will review the electronic version for upkeep, on a monthly basis, as a requirement of the application for payment requests by the Design-Builder.

3.3 MILESTONE SUBMITTAL: SUBSTANTIAL COMPLETION DRAFT:

- A. This submittal shall be in electronic and printed media formats. The Design-Builder shall submit two (2) electronic copies on USB drive media and shall also upload the electronic files to the internet-based hosting website utilized by the Owner for the project. The Design-Builder shall also prepare one (1) hard copy (printed media).
- B. The purpose of this submittal is to conduct a review of the documentation for its compliance to the O&M submittal prerequisites for the Design-Builder to obtain Substantial Completion status from the Owner. All sections of the O&M documentation shall be completed by the Design-Builder for this submittal.
- C. If, after Substantial Completion status is obtained, there is ongoing work that affect the content of this O&M documentation, the Design-Builder shall continue to keep the web-hosted version of the eO&M documentation current. The Design-Builder shall continue to provide continuous updates until the Final Completion Record Set is reviewed and approved by the Owner and CxA.

3.4 MILESTONE SUBMITTAL: FINAL COMPLETION SET:

- A. The Design-Builder shall provide complete updates to the Substantial Completion Draft documentation, for all electronic and print media.
- B. The purpose of this submittal is to provide the final O&M documentation for closeout of the Design-Builder's contract and to provide the Owner with a final Record Set for the project.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Description:

1. This section specifies the standards that the Design-Build shall follow for their scope of work related to Facilities Management Data (FM Data) Requirements. This section also includes information related to documents that are required for operations and maintenance support functions.
2. This section does not negate any other section that requires Commissioning or Operations and Maintenance Data.
3. Part 3 includes information about owner provided tools for managing the facilities management data and documents.

B. Related Sections:

1. Section 01 77 00 – Closeout Procedures
2. Section 01 91 00 - General Commissioning Requirements

PART 2 - PRODUCTS

2.1 SUBMITTALS

A. Facility Equipment Information

1. **Content:** The Design-Build will provide facilities information, that is:
 - a. Contact Information (email, company name, website, phone number) per the following:
 - i. general contractor(s)
 - ii. sub-contractors installing products from 'equipment information' section
 - iii. manufacturers providing equipment from 'equipment information' section
 - iv. Example: info@trane.com, Trane, trane.com, 999.999.9999
 - b. Space Information (Provided by Architect):
 - i. room number, room name, floor number, ceiling height, associated floor plans
(Mechanical ductwork and piping, Plumbing, Electrical power)
1. Example: M107, Main Mechanical Room, 01, 16', M-102A, M202-A, P-102A, E-102A

2. The drawings to be cross-referenced shall be the original contracted (awarded) drawings. If “as-builts” are produced at the end of the project, the updated drawings shall be substituted for the original drawings.
- c. Equipment Information: (for a list of expected Equipment Groups, see Table 01 – Required Equipment List)

Note: Equipment Groups are typical categories of assets with common characteristics and attributes that match equipment groups in the owner's operational systems. Effort has been made to align the information requested during construction to the format and content of the operational systems that will receive the information after turn-over to operations. Table 01 is a master list of equipment (or asset) groups that Operations requires to the extent that this equipment is part of the final construction scope of work (new and renovation).

i. Construction Start Data (Provided by Architect):

- a. General: equipment name (from plans), equipment location (room number), equipment description (with specific location as applicable), asset group. Example: a) AHU-1, M107, Air Handler, AHU
- b. Parent: Identify parent (upstream) component equipment as applicable. Parent / child relationships between equipment are critical to operational effectiveness after transition to operations. This information is used in the operational systems by the owner's facilities management organization.
 - a. ELEC: this should indicate the electrical panel feeding power to the component (asset / piece of equipment).
 - i. Example: for AHU-1, the electrical parent is Panel N1L1 (AHU-1 is powered from Panel N1L1)
 - b. HVAC: This shall indicate the mechanical equipment connections to the component (asset / piece of equipment)
 - i. Example: for AHU-1, the parent is “N/A”
Example: for VAV-1, the parent is “AHU-1”
- c. Support Locations: Support locations are the spaces (room numbers) that are impacted by (or supported by) equipment. This information could be limited to one room or multiple rooms. This information aids the operation team after transition to operations by knowing what spaces are affected by equipment that needs to be isolated (shut down) for various reasons. This information shall be provided for all HVAC terminal devices, such as Fan Coil Units and Fan Powered VAV boxes.

ii. Submittal Data:

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1. General: installer, manufacturer, model, approximate cost, expected life, warranty d. ration, associated approved submittal
 - a. Example: HVAC Installers, Trane, C1000, \$125,000, 30 years, 5 years, 23 00 10 - Air Handlers.pdf
 - b. This is information that will be added to the FM data once submittals are approved and specific equipment information has been determined.
4. Specific Attributes: For a list of applicable attributes, see Table 02 - Equipment Attributes. Equipment attributes vary by equipment group (asset group).
 - a. Example: air filter: 36"x36"x2" pleated, belt: 24" v notch
 - b. Examples of possible attributes are:
 - i. filter: type (oil, water, air) & size
- iii. Install Data: serial number, name plate photo, equipment photo
 1. Example: 100045312, AHU1-nameplate.jpg, AHU1.jpg
 2. This information can only be gathered once the equipment has been properly installed in the field. Photos should be taken of the equipment in the final installed condition (not in-process condition); however, the team shall collaborate with the owner on desired expectations prior to taking photos.
- iv. Close-Out Data: associated commissioning report, associated O&M document, associated warranty document in PDF format
 1. ex: CX-AHU1.pdf, OM-AHU1.pdf, WarrantyAHUs.pdf
- d. Referenced Documents:
 - i. Associated electronic files of referenced documents from 'space information' and 'equipment information'.
 - ii. Names of electronic files shall match what is referenced in the appropriate fields for document name. This specification does not prescribe a document nomenclature; however, it is expected that owner requirements detailing file naming are used with all referenced documents required in this specification.
- e. Decommissioned Equipment
 - i. List of equipment (corresponding to list from Table 01 Required Equipment) that was removed from the facility because of demolition or replacement during

the project. List shall contain equipment name, location, and asset group.

1. ex: AHU-1, M108, AHU

2. **Deliverable Format:** The Design-Build will provide facilities information, per the following:

- a. Contact, space, and equipment information shall be provided in spreadsheet format (XLSX, XSL, or CSV) and be an as-built representation. For an example of spreadsheet formatted deliverables, see Table 03 - Example Data Format.
- b. Referenced documents shall be provided in electronic format and organized per the following:
 - i. Parent folder named by building number and year of substantial completion. (Example: 1416-2013)
 - ii. Sub-folders named by document type (Submittals, O&Ms, Cx, Drawings, As-Built, Warranties)
 - iii. For an example of a spreadsheet formatted document deliverable, see Table 04- Reference Document Example
- c. The Design-Build will ensure the Facilities Maintenance Data is formatted appropriately (as Table 03 indicates) for loading into the Owner's Facilities Maintenance Provider's Computerized Maintenance Management System (CMMS)

3. **Schedule for Data Development:**

The Design-Build shall provide equipment information throughout the project as the information becomes available and approved for use. As seen in a previous section (equipment information), each set of fields are named to indicate the expected phase the data is to be provided. They include: 1) construction start, 2) submittal, 3) install, and 4) close-out.

The first set of fields will be those data points that are provided by the Design-Build at construction start. The second set of fields will be those data points that are to be provided by the Design-Build during the submittals stage. The third set of fields will be those data points that are to be provided by the Contractor during the install / inspection stage. The last (fourth) set of fields will be those data points that are to be provided by the Design-Build during the close-out stage.

Reasonable milestone dates for each of the four data deliverable phases shall be provided by the Design-Build for approval by the Owner at construction start. It is understood that some information may lag in the development cycle for construction, such as the completion of all submittals. The intent is for the Design-Build to make reasonable progress on the FM Data deliverables over the duration of the construction effort and not to defer the effort until the final months of the project. The entirety of the final data is to be completed within two weeks after substantial completion.

4. **Final Deliverable:** The Design-Build shall provide final deliverables to the owner within two (2) weeks of the substantial completion date. Deliverable data shall match what is within the web-based tool (the source), and shall be in spreadsheet format (XLS) along with zipped folder

of all associated reference files exported from that web-based tool. Format of deliverables, content, and schedule are addressed in other parts of this specification section.

End of this section contains all tables.

Table 01 - Required Equipment List

Table 02 - Equipment Attributes

Table 03 - Example Data Format

Note – The intent of Table 03 is to show an example of what the “hard copy” or objective deliverable would constitute for Contractor to Owner transmittal. When a web-based tool is used to organize and compile the data and documents, it is also required to have a final set of deliverables that can be transmitted to the Owner.

Table 04 - Reference Document Example

PART 3 - EXECUTION

3.1 Process

A. Web-Based Tool For Use

The information in this specification section is presented in tables (originated in XLS format). However, some critical aspects of the FM Data have relationships that are best managed in a relational database tool (and format). Therefore, a tool (a web-based software) is available to facilitate and simplify the organization of the required data and documents specified by the narrative and tables included herein. The web-based tool provides a means by which the complexities of the requirements can be more readily achieved, managed, verified, and handed over to the Owner during transition to operations and construction contract close-out. The web-based tool has been pre-configured to match the data requirements of the specification in advance for use by the construction team. That is, pick lists within the tool match the specification requirements, which provides for a measure of build in quality assurance and data validation. The tool also allows for delegation of trade-specific roles to sub-contractors by the Design-Build (if so elected by the Contractor). The tool provides a consistent platform by which the Owner's project manager and the Owner's designated facilities management organization can review progress of data and documents across multiple projects that are in-process. The tool also affords the project team and the Owner the production of a consistent deliverable for transition to operations actions across a wide- variety of projects and Contractors.

B. Submission and Review of Facilities Management Data (FM Data)

- a. The Design-Build shall provide the required data fields at the end of each major phase of construction as indicated in the schedule section above and per the related milestone dates approved by the owner.
- b. Data shall be submitted (made available) to owner at the agreed upon milestone dates for review purposes. The owner will review data for accuracy with documents and field conditions by various means.
- c. Following review at various stages, the Owner shall provide the Design-Build with an Issue Report. Issue Reports will contain any discovered deviations from field conditions or

inaccuracies of facilities data. Any identified deviations from field conditions (issues) will require the Design-Build to correct and resubmit the data within two (2) weeks of receiving the issue report.

C. Tools:

- a. The Design-Build shall maintain the facilities management data within the owner provided tool. The facilities data tool validates that naming standards from this specification are followed during data collection. Also, the tool provides constant access to the Owner for on-going review, comment, and export to spreadsheet format. The tool also allows for access of project information on mobile platforms in the field for data collection and field review purposes.
- b. The Owner provided facilities data tool is currently: O&M Logger, which can be accessed through web browser at: uw.omlogger.com

Table 01 - Required Equipment List

Note 1: This list (table) includes required equipment that can also be called an “Equipment Group Matrix” because the list is organized by “Asset Group” (second column below). The first column is the abbreviated name for the “Asset Group Code”. This table is organized by “System”.

Note 2: “Serialized” Assets are assets that will have an individual instance by piece of equipment and will be tracked individually. Example: AHU or Chiller. “Group” Assets are assets that will be handled as a “group” and not tracked individually. Example: Fire Alarm Devices

Code (Note 1)	Asset Group (Note 1)	Comments	Type (Note 2)	System
UW2000081	ACCESS PANELS	one per bldg	GROUP	ARCHITECTURAL
UW2000002	CEILING TILE SYSTEM	one per bldg	GROUP	ARCHITECTURAL
UW2000023	FLOORS SYSTEM	one per bldg	GROUP	ARCHITECTURAL
UW2000056	PARTITIANS, MOTORIZED		SERIALIZED	ARCHITECTURAL
UW2000061	SEATING, AUDITORIUM		GROUP	ARCHITECTURAL
UW1000004	DOOR, EXTERIOR		SERIALIZED	BUILDING
UW2000013	DOOR, EXTERIOR AUTO	proximity detection & auto opening etc.	SERIALIZED	BUILDING
UW1000008	DOOR, FIRE		SERIALIZED	BUILDING
UW1000005	DOOR, INTERIOR	one per bldg	GROUP	BUILDING
UW1000093	UW CAMPUS ART COLLECTION		SERIALIZED	BUILDING
UW2000080	WINDOW, EXTERIOR	one per bldg	GROUP	BUILDING
UW2000014	DOOR, SPECIAL ACTION	roll up doors etc.	SERIALIZED	EGRESS
UW2000017	EYE WASH, EMERGENCY		SERIALIZED	EHS
UW1000010	SHOWERS, EMERGENCY		SERIALIZED	EHS
UW1000054	TELEPHONE, EMERGENCY		SERIALIZED	EHS
D50952401	BATTERY SYSTEM AND CHARGER	one per system	GROUP	ELEC
G40951101	CATHODIC PROTECTION SYSTEM		SERIALIZED	ELEC
D50152201	CIRCUIT BREAKER, HIGH VOLTAGE AIR		SERIALIZED	ELEC
D50152221	CIRCUIT BREAKER, HIGH VOLTAGE OIL		SERIALIZED	ELEC
UW2000007	CONTROLS, LIGHTING	control panel & dimmers etc.	SERIALIZED	ELEC
UW2000010	DISCONNECT, ELECTRICAL	one per bldg	GROUP	ELEC
UW2000012	DOOR, ADA & OPENER		SERIALIZED	ELEC
UW2000016	DRIVES	vfd etc.	SERIALIZED	ELEC
D10951001	DUMBWAITER, ELECTRIC		SERIALIZED	ELEC
UW1000069	ELEVATOR		SERIALIZED	ELEC
D10251001	ESCALATOR, ELECTRIC		SERIALIZED	ELEC

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UW1000080	GENERATOR		SERIALIZED	ELEC
E10951261	HOIST / WINCH, CHAIN / CABLE, ELECTRIC		SERIALIZED	ELEC
E10351001	HYDRAULIC LIFT		SERIALIZED	ELEC
UW1000016	LIGHT, EMERGENCY		GROUP	ELEC
UW1000017	LIGHT, GENERAL USE		GROUP	ELEC
UW2000051	LIGHTNING PROTECTION SYSTEM		GROUP	ELEC
UW1000074	LOADING DOCK LEVELER		SERIALIZED	ELEC
UW1000018	MOTOR CONTROL CENTER		SERIALIZED	ELEC
D50152601	PANELBOARD, 225 A AND ABOVE		SERIALIZED	ELEC
UW2000063	SHADES, MACHANIZED		SERIALIZED	ELEC
UW2000064	SOLAR PV SYSTEM		GROUP	ELEC
UW2000069	SURGE PROTECTOR SYSTEM		SERIALIZED	ELEC
D50152341	SWITCH, AUTOMATIC TRANSFER		SERIALIZED	ELEC
D50152361	SWITCH, INTERRUPT, HIGH VOLTAGE, FUSED AIR		SERIALIZED	ELEC
D50152381	SWITCH, INTERRUPT, HIGH VOLTAGE, W/ AUX FUSES, AIR		SERIALIZED	ELEC
D50152301	SWITCH, SELECTOR, HIGH VOLTAGE, AIR		SERIALIZED	ELEC
D50152321	SWITCH, SELECTOR, HIGH VOLTAGE, OIL		SERIALIZED	ELEC
D50152101	SWITCHBOARD	switch gear	SERIALIZED	ELEC
D50152401	TRANSFORMER, DRY TYPE 500 KVA AND OVER		SERIALIZED	ELEC
UW2000076	TRANSFORMER, MV INTERIOR		SERIALIZED	ELEC
D50152402	TRANSFORMER, OIL PAD MOUNTED		SERIALIZED	ELEC
D50152403	TRANSFORMER, OIL PAD MOUNTED, PCB		SERIALIZED	ELEC
UW1000021	UNINTERRUPTED POWER SYSTEM		SERIALIZED	ELEC
D10153101	WHEELCHAIR LIFT		SERIALIZED	ELEC
D40951001	EXTINGUISHING SYSTEM, CO2		SERIALIZED	FIRE
D40151801	EXTINGUISHING SYSTEM, DELUGE / PREACTION		SERIALIZED	FIRE
D40153101	EXTINGUISHING SYSTEM, DRY PIPE		SERIALIZED	FIRE

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D40954001	EXTINGUISHING SYSTEM, DRY CHEMICAL		SERIALIZED	FIRE
D40954501	EXTINGUISHING SYSTEM, HALON		SERIALIZED	FIRE
D40151501	EXTINGUISHING SYSTEM, WET PIPE		SERIALIZED	FIRE
D50357101	FIRE ALARM ANNUCIATOR SYSTEM		SERIALIZED	FIRE
UW1000063	FIRE ALARM SYSTEM	master fire alarm panel	SERIALIZED	FIRE
D30451701	FIRE DAMPERS		SERIALIZED	FIRE
UW1000083	FIRE EXTINGUISHER		SERIALIZED	FIRE
G30154101	FIRE HYDRANT		SERIALIZED	FIRE
UW1000011	FIRE PUMP		SERIALIZED	FIRE
UW2000020	FIRE INDICATING SYSTEM	strobes & horns etc.	GROUP	FIRE ALARM
UW2000021	FIRE INITIATING SYSTEM	pulls & detectors etc.	GROUP	FIRE ALARM
UW2000022	FIRE JOCKEY PUMP		SERIALIZED	FIRE SUPPRESSION
UW2000024	FOOD SERVICE, DISHWASHER		SERIALIZED	FOOD SERVICE
UW2000025	FOOD SERVICE, FREEZER		SERIALIZED	FOOD SERVICE
UW2000027	FOOD SERVICE, FRYER		SERIALIZED	FOOD SERVICE
UW2000028	FOOD SERVICE, OVEN		SERIALIZED	FOOD SERVICE
UW2000029	FOOD SERVICE, RANGE		SERIALIZED	FOOD SERVICE
UW2000030	FOOD SERVICE, WASTE DISPOSAL		SERIALIZED	FOOD SERVICE
UW2000040	ICE MAKER		SERIALIZED	FOOD SERVICE
UW2000065	SPECIALTY SINKS	surgeons sinks etc.	GROUP	FOOD SERVICE
UW1000027	AIR HANDLING UNIT		SERIALIZED	HVAC
UW1000001	BOILER (PV)		SERIALIZED	HVAC
UW1000085	CHILLER (PV)		SERIALIZED	HVAC
UW2000004	CONTROL, EXHAUST VALVE		SERIALIZED	HVAC
ARCF-12	CONTROL, SUPPLY AIR VALVE		SERIALIZED	HVAC
D30651001	CONTROLS, CENTRAL SYSTEM, ELECTRO/PNEUMATIC		SERIALIZED	HVAC
UW1000086	ECONOMIZER (PV)		SERIALIZED	HVAC
ARCF-13	EQUIPMENT SNORKEL	fan mounted snorkel	SERIALIZED	HVAC
D30351701	EVAPORATIVE COOLER		SERIALIZED	HVAC
D30451201	FAN COIL UNIT		SERIALIZED	HVAC
UW1000072	FAN, EXHAUST		SERIALIZED	HVAC
UW2000018	FAN, MISC.		SERIALIZED	HVAC
UW2000019	FAN, RECIRCULATING		SERIALIZED	HVAC
UW1000073	FAN, SUPPLY		SERIALIZED	HVAC
UW2000032	FUME HOOD		SERIALIZED	HVAC

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UW2000037	HEAT & ENERGY RECOVERY UNIT		SERIALIZED	HVAC
UW1000087	HEAT EXCHANGER (PV)		SERIALIZED	HVAC
UW2000039	HVAC WATER TREATMENT SYSTEM		GROUP	HVAC
UW2000041	INCUBATOR		SERIALIZED	HVAC
UW1000088	JACKETED KETTLE (PV)		SERIALIZED	HVAC
UW2000054	PACKAGE TERMINAL UNIT		SERIALIZED	HVAC
UW2000055	PACKAGE UNIT AC		SERIALIZED	HVAC
D10952001	PNEUMATIC TUBE SYSTEM		SERIALIZED	HVAC
UW1000078	REFRIGERATION		SERIALIZED	HVAC
D30952101	STEAM HUMIDIFICATION SYSTEM		SERIALIZED	HVAC
D30551103	UNIT HEATER		SERIALIZED	HVAC
D30451601	VAV BOXES		SERIALIZED	HVAC
UW2000067	STEAM TRAP		SERIALIZED	HVAC/PLUMB
UW2000058	PUMP, MISC.		SERIALIZED	HVAC/PLUMB/PLANT
UW2000003	CONTROLS, MOTORIZED HVAC VALVE		SERIALIZED	HVAC-CONTROLS
UW2000006	CONTROLS, HVAC DEVICE	afms etc. no t-stats	SERIALIZED	HVAC-CONTROLS
UW2000008	CONTROLS, MOTORIZED DAMPER		SERIALIZED	HVAC-CONTROLS
UW2000005	CONTROLS, PANEL		SERIALIZED	HVAC-CONTROLS
UW2000042	IRRIGATION, BACKFLOW PREVENTION DEVICE		SERIALIZED	IRRIGATION
UW2000044	IRRIGATION, CONTROLS & METERS		SERIALIZED	IRRIGATION
UW2000045	IRRIGATION, PUMPS		SERIALIZED	IRRIGATION
UW2000046	IRRIGATION, SHUT-OFF VALVES		SERIALIZED	IRRIGATION
UW2000047	IRRIGATION, SYSTEM		GROUP	IRRIGATION
UW1000071	AIR COMPRESSOR		SERIALIZED	PLUMB
UW1000084	AIR SEPARATOR (PV)		SERIALIZED	PLUMB
UW1000000	BACKFLOW PREVENTION DEVICE		SERIALIZED	PLUMB
UW2000009	DEIONIZED SYSTEM		SERIALIZED	PLUMB
UW2000015	DRINKING FOUNTAIN & WATER COOLERS		SERIALIZED	PLUMB
G30254101	EJECTOR, SEWAGE		SERIALIZED	PLUMB
ARCF-15	EXPANSION JOINT BELLOWS		SERIALIZED	PLUMB
UW2000031	FOUNTAIN		SERIALIZED	PLUMB
UW2000033	GAS EARTHQUAKE VALVE		SERIALIZED	PLUMB
UW2000034	GAS REGULATOR		SERIALIZED	PLUMB
UW2000035	GAS SYSTEM		GROUP	PLUMB
UW2000036	GRAY WATER SYSTEM		GROUP	PLUMB

FM Data Requirements for O&M

UW2000038	HEAT TRACING & ANTI ICING SYSTEM		GROUP	PLUMB
UW2000048	LAB AIR SYSTEM		GROUP	PLUMB
UW2000052	MANHOLE		SERIALIZED	PLUMB
UW2000057	PLUMBING FIXTURE SYSTEM		GROUP	PLUMB
G30156321	REVERSE OSMOSIS SYSTEM		GROUP	PLUMB
UW1000009	SEWAGE LIFT STATION		SERIALIZED	PLUMB
UW2000068	STEAM, PRESSURE REDUCING VALVE & STATION		SERIALIZED	PLUMB
UW1000026	STEAM/HOT WATER CONVERTER		SERIALIZED	PLUMB
UW1000090	TANK (PV)	pressure vessel	SERIALIZED	PLUMB
UW2000070	TANK, ACID		SERIALIZED	PLUMB
UW2000071	TANK, CISTERN		SERIALIZED	PLUMB
UW2000073	TANK, GREASE TRAP		SERIALIZED	PLUMB
UW2000074	TANK, MISC.		SERIALIZED	PLUMB
UW2000075	TANK, OIL & SEPERATOR		SERIALIZED	PLUMB
UW1000091	UNFIRED (PV)	pressure vessel	SERIALIZED	PLUMB
UW2000078	VALVE, BACKWATER SEWAGE		SERIALIZED	PLUMB
D20251301	VALVE, BALL, ABOVE 4in		SERIALIZED	PLUMB
D20251201	VALVE, BUTTERFLY, ABOVE 4in		SERIALIZED	PLUMB
D20251251	VALVE, CHECK, ABOVE 4in		SERIALIZED	PLUMB
UW2000079	VALVE, FLUSHOMETER		GROUP	PLUMB
D20251401	VALVE, GATE, ABOVE 4in		SERIALIZED	PLUMB
D20251451	VALVE, GLOBE, ABOVE 4in		SERIALIZED	PLUMB
D20251551	VALVE, OS AND Y, ABOVE 4in		SERIALIZED	PLUMB
G30154201	VALVE, POST INDICATOR		SERIALIZED	PLUMB
D20252651	VALVE, PRESSURE REGULAR, ABOVE 4in		SERIALIZED	PLUMB
D20252621	VALVE, PRESSURE RELIEF, ABOVE 4in		SERIALIZED	PLUMB
D20252701	VALVE, SEDIMENT STRAINER, ABOVE 4in		SERIALIZED	PLUMB
UW1000024	WATER HEATER (PV)		SERIALIZED	PLUMB
D20252603	WATER HEATER, STEAM 2500 GAL.		SERIALIZED	PLUMB
G30156501	WATER SOFTNER		SERIALIZED	PLUMB
D30454201	PUMP W/ OIL RESERVOIR, ELECTRIC		SERIALIZED	PUMP
UW1000092	PUMP, CIRCULATION		SERIALIZED	PUMP

FM Data Requirements for O&M

UW1000075	PUMP, CONDENSATE AIR		SERIALIZED	PUMP
D30253103	PUMP, CONDENSATE RETURN UNIT, 2 PUMPS		SERIALIZED	PUMP
D30253102	PUMP, CONDENSATE RETURN, OVER 1 H.P.		SERIALIZED	PUMP
UW1000076	PUMP, CONDENSATE STEAM		SERIALIZED	PUMP
G30151264	PUMP, MIXED OR AXIAL FLOW		SERIALIZED	PUMP
G30151265	PUMP, RECIPROCATING DISPLACEMENT		SERIALIZED	PUMP
UW1000077	PUMP, SUMP		SERIALIZED	PUMP
G30151269	PUMP, VACUUM		SERIALIZED	PUMP
ARCF-05	ANIMAL WATERING		SERIALIZED	RESEARCH
ARCF-02	AUTOCLAVE		SERIALIZED	RESEARCH
ARCF-07	BEDDING DELIVERY SYSTEM		SERIALIZED	RESEARCH
ARCF-06	BEDDING DISPOSAL SYSTEM		SERIALIZED	RESEARCH
ARCF-08	BIO SAFETY CABINET		SERIALIZED	RESEARCH
ARCF-09	CHLORI-FLUSH STATION		SERIALIZED	RESEARCH
ARCF-10	CHLORINE INJECTOR		SERIALIZED	RESEARCH
ARCF-11	COLD ROOM		SERIALIZED	RESEARCH
ARCF-14	EXAM LIGHT FIXTURE		SERIALIZED	RESEARCH
ARCF-16	IR RADIATOR		SERIALIZED	RESEARCH
ARCF-03	RACK WASHER		SERIALIZED	RESEARCH
ARCF-17	SURGERY LIGHT FIXTURE		SERIALIZED	RESEARCH
ARCF-01	TUNNLE WASHER		SERIALIZED	RESEARCH
ARCF-04	WATER LEAK DETECTION SYSTEM		SERIALIZED	RESEARCH
UW2000059	ROOF SYSTEM	per roof type	GROUP	ROOF
UW2000060	ROOF, GUTTERS		GROUP	ROOF
UW2000000	BURGLER ALARM		GROUP	SECURITY
UW2000001	CARD READER		GROUP	SECURITY
UW2000011	DOOR POSITION SWITCH		GROUP	SECURITY
UW2000062	SECURITY CAMERA		GROUP	SECURITY
UW2000049	LIGHT, EXTERIOR		GROUP	SITE
UW2000050	LIGHT, POLES		SERIALIZED	SITE
UW2000072	TANK, FUEL		SERIALIZED	SITE
UW2000077	TRASH COMPACTOR		SERIALIZED	SITE
UW1000023	COOLING TOWER, CLOSED LOOP		SERIALIZED	UTIL
UW1000022	COOLING TOWER, OPEN LOOP		SERIALIZED	UTIL
UW2000053	METER, WAGES		SERIALIZED	UTIL

| | | |

Table 02 - Equipment Attributes

Code (Note1)	Asset Group (Note 1)	System	Elec Prnt	HVAC Prnt	Suprt Loc	ATT 1	ATT 2	ATT 3	ATT 4
G4095110 1	CATHODIC PROTECTION SYSTEM	ELEC	YES						
D50152201	CIRCUIT BREAKER, HIGH VOLTAGE AIR	ELEC	YES						
D50152221	CIRCUIT BREAKER, HIGH VOLTAGE OIL	ELEC	YES						
UW200000 7	CONTROLS, LIGHTING	ELEC	YES						
UW200001 2	DOOR, ADA & OPENER	ELEC	YES						
UW200001 6	DRIVES	ELEC	YES						
D10951001	DUMBWAITER, ELECTRIC	ELEC	YES						
UW100006 9	ELEVATOR	ELEC	YES						
D10251001	ESCALATOR, ELECTRIC	ELEC	YES						
UW100008 0	GENERATOR	ELEC	YES						
E10951261	HOIST / WINCH, CHAIN / CABLE, ELECTRIC	ELEC	YES						
E10351001	HYDRAULIC LIFT	ELEC	YES						
UW100007 4	LOADING DOCK LEVELER	ELEC	YES						
UW100001 8	MOTOR CONTROL CENTER	ELEC	YES						
D50152601	PANELBOARD, 225 A AND ABOVE	ELEC	YES						
UW200006 3	SHADES, MACHANIZED	ELEC	YES						
D50152101	SWITCHBOARD	ELEC	YES						
UW200007 6	TRANSFORMER, MV INTERIOR	ELEC	YES						
D10153101	WHEELCHAIR LIFT	ELEC	YES						
D50357101	FIRE ALARM ANNUCIATOR SYSTEM	FIRE	YES						
UW100006 3	FIRE ALARM SYSTEM	FIRE	YES						
D30451701	FIRE DAMPERS	FIRE	YES						
UW200002 2	FIRE JOCKEY PUMP	FIRE SUPPRESSI ON	YES						

UW200002 4	FOOD SERVICE, DISHWASHER	FOOD SERVICE	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200002 5	FOOD SERVICE, FREEZER	FOOD SERVICE	YES			FILTE R 1	FILTE R 2		
UW200002 7	FOOD SERVICE, FRYER	FOOD SERVICE	YES						
UW200002 8	FOOD SERVICE, OVEN	FOOD SERVICE	YES						
UW200002 9	FOOD SERVICE, RANGE	FOOD SERVICE	YES						
UW200003 0	FOOD SERVICE, WASTE DISPOSAL	FOOD SERVICE	YES						
UW200004 0	ICE MAKER	FOOD SERVICE	YES			FILTE R 1	FILTE R 2		
UW100002 7	AIR HANDLING UNIT	HVAC	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100000 1	BOILER (PV)	HVAC	YES			FILTE R 1	FILTE R 2		
UW100008 5	CHILLER (PV)	HVAC	YES			FILTE R 1	FILTE R 2		
UW200000 4	CONTROL, EXHAUST VALVE	HVAC	YES	YES					
ARCF-12	CONTROL, SUPPLY AIR VALVE	HVAC	YES	YES					
D30651001	CONTROLS, CENTRAL SYSTEM, ELECTRO/PNEUMATI C	HVAC		YES					
UW100008 6	ECONOMIZER (PV)	HVAC	YES	YES					
ARCF-13	EQUIPMENT SNORKEL	HVAC	YES						
D30351701	EVAPORATIVE COOLER	HVAC	YES	YES					
D30451201	FAN COIL UNIT	HVAC	YES		YES	FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100007 2	FAN, EXHAUST	HVAC	YES					BELT 1	BELT 2
UW200001 8	FAN, MISC.	HVAC	YES					BELT 1	BELT 2
UW200001 9	FAN, RECIRCULATING	HVAC	YES					BELT 1	BELT 2
UW100007 3	FAN, SUPPLY	HVAC	YES	YES				BELT 1	BELT 2
UW200003 2	FUME HOOD	HVAC	YES	YES		FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200003 7	HEAT & ENERGY RECOVERY UNIT	HVAC	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2

UW100008 7	HEAT EXCHANGER (PV)	HVAC	YES						
UW200004 1	INCUBATOR	HVAC	YES						
UW100008 8	JACKETED KETTLE (PV)	HVAC	YES						
UW200005 4	PACKAGE TERMINAL UNIT	HVAC	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200005 5	PACKAGE UNIT AC PNEUMATIC TUBE SYSTEM	HVAC	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
D10952001		HVAC	YES						
UW100007 8	REFRIGERATION	HVAC	YES			FILTE R 1	FILTE R 2		
D30952101	STEAM HUMIDIFICATION SYSTEM	HVAC	YES						
D30551103	UNIT HEATER	HVAC	YES						
D30451601	VAV BOXES	HVAC	YES	YES	YES	FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200005 8	PUMP, MISC.	HVAC/PLUM B/PLANT	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200000 3	CONTORLS, MOTORIZED HVAC VALVE	HVAC- CONTROLS	YES						
UW200000 6	CONTROLS, HVAC DEVICE	HVAC- CONTROLS	YES	YES					
UW200000 8	CONTROLS, MOTORIZED DAMPER	HVAC- CONTROLS	YES						
UW200000 5	CONTROLS, PANEL	HVAC- CONTROLS	YES						
UW200004 4	IRRIGATION, CONTROLS & METERS	IRRIGATION	YES						
UW200004 5	IRRIGATION, PUMPS	IRRIGATION	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100007 1	AIR COMPRESSOR	PLUMB	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200001 5	DRINKING FOUNTAIN & WATER COOLERS	PLUMB	YES			FILTE R 1	FILTE R 2		
G3025410 1	EJECTOR, SEWAGE	PLUMB	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW200003 1	FOUNTAIN	PLUMB	YES			FILTE R 1	FILTE R 2		
UW100000 9	SEWAGE LIFT STATION	PLUMB	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100002 6	STEAM/HOT WATER CONVERTER	PLUMB	YES						

UW100002 4	WATER HEATER (PV)	PLUMB	YES						
G3015650 1	WATER SOFTNER	PLUMB	YES						
D30454201	PUMP W/ OIL RESERVOIR, ELECTRIC	PUMP	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100009 2	PUMP, CIRCULATION	PUMP	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
D30253102	PUMP, CONDENSATE RETURN, OVER 1 H.P.	PUMP	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
UW100007 7	PUMP, SUMP	PUMP	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
G3015126 9	PUMP, VACUUM	PUMP	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
ARCF-05	ANIMAL WATERING	RESEARCH	YES						
ARCF-02	AUTOCLAVE	RESEARCH	YES						
ARCF-07	BEDDING DELIVERY SYSTEM	RESEARCH	YES						
ARCF-06	BEDDING DISPOSAL SYSTEM	RESEARCH	YES						
ARCF-08	BIO SAFETY CABINET	RESEARCH	YES						
ARCF-09	CHLORI-FLUSH STATION	RESEARCH	YES						
ARCF-10	CHLORINE INJECTOR	RESEARCH	YES						
ARCF-11	COLD ROOM	RESEARCH	YES			FILTE R 1	FILTE R 2	BELT 1	BELT 2
ARCF-14	EXAM LIGHT FIXTURE	RESEARCH	YES						
ARCF-16	IRADIATOR	RESEARCH	YES						
ARCF-03	RACK WASHER	RESEARCH	YES						
ARCF-17	SURGERY LIGHT FIXTURE	RESEARCH	YES						
ARCF-01	TUNNLE WASHER	RESEARCH	YES						
ARCF-04	WATER LEAK DETECTION SYSTEM	RESEARCH	YES						
UW200005 0	LIGHT, POLES	SITE	YES						
UW200007 7	TRASH COMPACTOR	SITE	YES						
UW100002 3	COOLING TOWER, CLOSED LOOP	UTIL	YES						
UW100002 2	COOLING TOWER, OPEN LOOP	UTIL	YES						
UW200005 3	METER, WAGES	UTIL	YES						

Table 03 - Example Data Format

Space Information - Tab								
Number	Name	Floor	SF	Ceiling Height	Drawings	Drawings	Drawings	Drawings
100	LOBBY	1	1413	12	M102-A	M202-A	P102-A	E102-A
101	FOOD PREP	1	3648	12	M102-A	M202-A	P102-A	E102-A
102	DINING	1	4516	12	M102-A	M202-A	P102-A	E102-A
103	IT	1	40	12	M102-A	M202-A	P102-A	E102-A
104	UNISEX	1	75	12	M102-A	M202-A	P102-A	E102-A
105	MENS	1	288	12	M102-A	M202-A	P102-A	E102-A
106	WOMENS	1	289	12	M102-A	M202-A	P102-A	E102-A
110	MECHANICAL	1	292	12	M102-A	M202-A	P102-A	E102-A
111	STAIR	1	81	12	M102-B	M202-B	P102-B	E102-B
112	OFFICE	1	81	12	M102-B	M202-B	P102-B	E102-B
113	CUSTODIAL	1	257	12	M102-B	M202-B	P102-B	E102-B
114	OFFICE	1	96	12	M102-B	M202-B	P102-B	E102-B
115	OFFICE	1	96	12	M102-B	M202-B	P102-B	E102-B
116	OFFICE	1	96	12	M102-B	M202-B	P102-B	E102-B
117	OFFICE	1	159	12	M102-B	M202-B	P102-B	E102-B

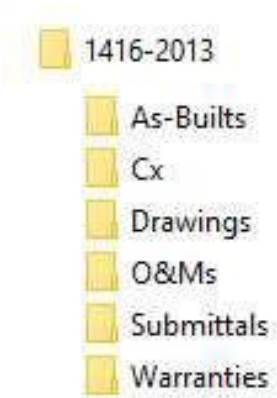
Contact Information - Tab			
Email	Company Name	Website	Phone Number
info@CUMMINSPOWERGENERATIO	CUMMINS POWER	www.CUMMINSPOWERGENERATIO	123-456-7890
info@YORK.com	YORK	www.YORK.com	123-456-7890
info@JOHNSONCONTROLS.com	JOHNSON CONTROLS	www.JOHNSONCONTROLS.com	123-456-7890
info@PENTAIR.com	PENTAIR	www.PENTAIR.com	123-456-7890
info@RECOUSA.com	RECOUSA	www.RECOUSA.com	123-456-7890
info@GENERALELECTRIC.com	GENERAL ELECTRIC	www.GENERALELECTRIC.com	123-456-7890
info@MARATHON.com	MARATHON	www.MARATHON.COM	123-456-7890
info@TDINDUSTRIES.com	TD INDUSTRIES	WWW.TDINDUSTRIES.COM	123-456-7890

Table 03 - Example Data Format

Equipment Information – Tab			
Name	AHU-1	FPB-10	CHWP-1
Location	146	101	146
Description	Air Handling Unit	Fan Powered VAV	Pump
Asset Group	AHU-LARGE	VAV-FP	PUMP-CIRC
Installer	TD INDUSTRIES	TD INDUSTRIES	TD INDUSTRIES
Manufacturer	YORK	JOHNSON CONTROLS	PENTAIR
Model	ITF-BD20	GVL-OP-42	ES-6000-V
Original Cost	\$30,000	\$750	\$1,000
Expected Life	15 YEARS	5 YEARS	10 YEARS
Warranty Term	5 YEARS	1 YEAR	1 YEAR
Submittals	23 73 14.001.0 AHU's (PD-SD) 2012-2-3.pdf	23 36 00.001.0 Air Terminal Units (PD) 2012-1-27.pdf	23 73 14.001.0 AHU's (PD-SD) 2012-2-3.pdf
Serial	FCJ121004-01	700120-12	2122403934
NamePlate Photo	AHU-1NP.jpg	FPB-10NP.jpg	CHWP-1NP.jpg
Equipment Photo	AHU-1.jpg	FPB-10.jpg	CHWP-1.jpg
O&M Files	OM-32 - HVAC-(Air Handler Unit_1).pdf	OM-Air Terminal Units.pdf	OM-Chilled Water Pumps.pdf
Cx Files	Cx-32 - HVAC-(Air Handler Unit_1).pdf	Cx-Air Terminal Units.pdf	Cx-Chilled Water Pumps.pdf
Warranty File	War-32 - HVAC-(Air Handler Unit_1).pdf	War-Air Terminal Units.pdf	War-Chilled Water Pumps.pdf
Elec Parent	N1L1	N1L3	N1LDPK1
HVAC Parent		AHU-1	
Support Locations	100, 101, 102, 103, 104, 105, 106, 110, 111, 112, 113, 114, 115, 116, 117	102	
Attributes1	air filter: Pleated 48x48		
Attributes1	supply fan belt: 42" v notch	fan belt: 12" v notch	

Table 04 - Reference Document Example

Note – The following directory format is for the electronic files that are part of the deliverable.



PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - 1. General closeout requirements are included in Section 01 77 00 "Closeout Procedures."
 - 2. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Design-Builder of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors that are required to countersign special warranties with the Design-Builder.

1.2 DEFINITIONS

- A. "Standard Product Warranties" are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. "Special Warranties" are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS

- A. General: Upon determination that Work covered by a warranty has failed, correct or replace the Work to an acceptable condition complying with requirements of Contract Documents.
- B. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected or replaced and retested and/or re-commissioned reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- D. Costs: The Design-Builder is responsible for the cost of correcting or replacing including the cost for retesting and/or re-commissioning defective Work, regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- E. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 - 2. Right to Refuse Work: The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on

such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTALS

- A. Submit written warranties to the Owner's Representative. Provide a draft for Owner's review and comment prior to final execution. Warranties shall identify:
 - 1. Scope description of what is covered (indicate labor and/or materials requirements);
 - 2. The date of the warranty's start and finish (indicate the specified warranty duration);
 - 3. Service and maintenance contracts, when specified in the Contract Documents;
 - 4. Supplier's name, address, e-mail address, and telephone number;
 - 5. Proper procedure in case of failure; and
 - 6. Instances which might affect validity of warranty.
- B. When a special warranty is required to be executed by the Design-Builder, or the Design-Builder and a Subcontractor, supplier, or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.
- C. Include warranties in the Operations and Maintenance Manual (see Section 01 77 00 "Closeout Procedures").
- D. Review and acceptance, by Owner, of submitted warranties does not relieve the Design-Builder of the warranty requirements of the Contract Documents.
- E. The Owner may generate and keep electronic copies of original executed warranties, certifications, and other similar commitments and such copies shall be considered as originals.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. Description: This section includes administrative and procedural requirements for providing demonstration and training to the Owner, as executed according to the Owner Training Plan, including the following:
 - 1. Deliverable format and content requirements for the Owner Training Plan,
 - 2. Procedural and content requirements for Owner training sessions,
 - 3. Deliverable requirements for video recording of Owner training sessions.
- B. Related Sections:
 - 1. Section 01 32 16 – Construction Progress Schedule
 - 2. Section 01 77 00 – Closeout Procedures
 - 3. Section 01 91 00 – General Commissioning Requirements

1.2 MANAGEMENT OF THE OWNER TRAINING PROCESS

- A. The Commissioning Authority (CxA) for the project will prepare the draft outline of the Owner Training Plan. This draft outline will include the training sessions required for the project, a sample training calendar, and a sample training session agenda template.
- B. The Design-Builder's Commissioning Manager (CxM) shall take over management and updating of the draft Owner Training Plan and fill in all information required to produce a complete and comprehensive document.
- C. The completed Owner Training Plan shall be submitted to the A/E, Owner, and CxA for review and approval. The Contractor shall incorporate all revisions per the review comments.
- D. After the Owner Training Plan is approved, the Design-Builder shall continue to make updates and distribute the revised plan as changes occur.
- E. The CxM shall prepare a current, three-month look ahead Owner Training Calendar and distribute the document at all of the weekly commissioning meetings, as well as maintain a current electronic version on the project's website for electronic document postings.
- F. The CxM shall keep a current and complete version of the Owner Training Plan on site, in a location that is accessible by the CxA, Owner, and Contractor.
- G. The CxM shall provide notification of upcoming training sessions to the Owner and CxA and shall include the name of the training session, the date, the time, and the meeting location. The notifications shall be in two parts for each session:
 - 1. Part 1: The CxM shall, at the end of each work week, send notification of all upcoming training sessions for the preceding week.
 - 2. Part 2: The CxM shall send notification of each upcoming training session on the morning of the day before it occurs.

- H. During the training session, the Design-Builder shall provide one hard copy of the latest electronic Operation & Maintenance documentation (eO&M) pertaining to the training topic. This documentation shall be used as a training reference and shall be available for review by all participants.
- I. The Owner training sessions will consist of several types of sessions, as follows:
 - 1. Initial Design Overview Training Sessions: These training sessions will be performed by a member of the Design Team. The purpose of these sessions is to give a broad overview of the design intent for each discipline. Five sessions will be held, including Architectural, Mechanical, Plumbing, Electrical Power/Lighting, and Electrical Low Voltage.
 - 2. Contractor/Vendor Training Sessions: These training sessions will be performed by the Design-Builder, typically utilizing the vendor or installing subcontractor who has sufficient qualifications to provide the training. The Design-Builder shall prepare training agendas ahead of time, based on the training agenda templates.
 - 3. Video Instructions: The Design-Builder shall provide training videos for the Owner's future reference and instruction. The video training shall be provided in two parts, in accordance with the following:
 - a. The Design-Builder shall utilize the services of a professional videographer experienced in producing training videos for construction projects. The videographer shall record the training and demonstration sessions presented to the Owner.
 - b. Where the manufacturer has standard training videos and will allow the Owner to copy the videos for Owner's use, the Design-Builder shall obtain those training videos and convert them to the video electronic file format being used for the rest of the video training materials.

1.3 TRAINING INSTRUCTORS QUALIFICATIONS

- A. For each training session, the Design-Builder shall provide training instructors who are both knowledgeable in the technical aspects of the equipment/system as well as the project specifics, including how the equipment/system relates to the project.
- B. The Design-Builder shall provide more than one instructor in cases where one instructor does not have both the technical expertise of the equipment/system and the familiarity with the project and how the equipment/system relates to the project.
- C. The instructors shall have the ability to speak clearly and in an organized manner to maximize the effectiveness of the training.
- D. The instructors shall tailor the training agenda to meet the technical aptitude and relevance of training materials for the audience in attendance.
- E. The instructors shall use the latest version of the electronic Operations and Maintenance (eO&M) documentation as a reference tool for the instructional training materials. This presentation of the eO&M documentation will also serve as an introduction of the O&M documentation that will be available to the Owner for that particular subject.

1.4 TRAINING VIDEO SUBMITTAL SCHEDULE

- A. The training videos shall be available for Owner's use, within the eO&M document, no less than 14 calendar days prior to the turnover of building operations from the Contractor to the Owner.

PART 2 - PRODUCTS

2.1 OWNER TRAINING PLAN

- A. The Design-Builder shall develop a complete Owner Training Plan, based on the template document provided to them from the CxA.
- B. The plan shall contain the following elements:
 - 1. Training Matrix:
 - a. Provide a single spreadsheet document containing a summary of the training sessions to be conducted,
 - b. List of training sessions required,
 - c. Brief description of training session topic(s),
 - d. Name of instructor(s) and employee(s),
 - e. Owner's intended audience of the session.
 - 2. Training Sessions Calendar:
 - a. Provide a series of calendar pages with one month indicated per page,
 - b. Individual training sessions listed on the day it occurs including the name of the session, the start time, the meeting location, and the expected duration.
 - 3. Training Session Agendas:
 - a. Provide separate training agendas for each training session including the following:
 - 1) Attendance sign-in sheet
 - 2) Name of project,
 - 3) Title of training session,
 - 4) Instructor's name(s), title(s), and company(ies),
 - 5) Name of installing contractor,
 - 6) Itinerary for topics to be covered in the classroom setting,
 - 7) Site walk.
 - b. The itinerary of topics to be covered shall include the following, but may be altered during the review process of the Owner Training Plan:
 - 1) Introduction of instructor(s),
 - 2) Contact information for service,
 - 3) Warranty information including warranty expiration dates (both the manufacturer's warranty as well as the additional warranty requirements of the contract documents) and any requirements to maintain the warranties,
 - 4) Basic description of the topic and how it relates to the facility (description of the equipment/system, purpose, location/service access, what it serves, and basic operation),
 - 5) Any special or unique features of the equipment/system,
 - 6) Log-in procedures to equipment/system controls and monitoring interfaces,
 - 7) Setup procedures including review of programmed parameters (where applicable) and calibration processes. The Contractor shall provide one copy of the startup documentation (when startup documentation is required to be provided) for review by the audience during the training session,
 - 8) Equipment/system startup procedures (using eO&M documentation as a reference),

- 9) Normal operation mode procedures (using eO&M documentation as a reference),
- 10) Equipment/system shutdown procedures (using eO&M documentation as a reference),
- 11) Emergency condition procedures (for each emergency situation),
- 12) Expected restart response of equipment/system after a loss of electrical power event as well as restoration of electrical power event,
- 13) Expected response to a building fire alarm event or other fire alarm system action,
- 14) Interfaces of the equipment/system to other building equipment/systems,
- 15) Preventative maintenance procedures (using eO&M documentation as a reference),
- 16) Operational troubleshooting procedures (using eO&M as a reference),
- 17) Safety precautions,
- 18) Regulatory requirements,
- 19) Instruction for proprietary tools, instruments, or software,
- 20) Recommended spare parts,
- 21) Intermissions,
- 22) Job site walk-through,
- 23) Questions and answer period.

2.2 TRAINING VIDEOS

- A. The Design-Builder shall include all training videos in the appropriate section of the electronic Operation and Maintenance (eO&M) document by inserting the electronic training video file into the appropriate file folder of the eO&M and creating a link to each video according that automatically starts the video playback. Coordinate with the Owner as to the video playback software and video file types that will be available for launching and playing the video from the eO&M document.
- B. Manufacturer's/Vendor's Training Videos:
 1. If training videos are available from the manufacturer or vendor, the Design-Builder shall obtain those videos and provide the video materials in the standard electronic video file format for the eO&M's.
 2. The Design-Builder shall first confirm with the manufacturer, and obtain written permission from them, that the video materials can be copied for use by the University of Washington without infringing on any intellectual property protections for the materials.
- C. Contractor's Video Recording of Owner Training and Demonstration Sessions:
 1. The Design-Builder shall use the services of a professional videographer to video record the instructional training and demonstrations required for the project.
 2. The videographer shall have the following minimum qualifications and capabilities:
 - a. The videographer shall have experience in providing training video recording services for at least two construction projects of similar size and scope.
 - b. The videographer shall provide all equipment necessary to produce high quality training videos including, but not limited to
 - 1) High resolution video camera(s),
 - 2) Tripods and other equipment/methods necessary to produce stable video recording images,

- 3) High quality microphones, including a wireless, clip-on microphone for the instructor's use as well as boom-type microphone to capture the other audio within the room.
 - 4) Appropriate software to edit, organize, and convert videos to the required electronic video file format,
3. The training videos shall be edited to follow a similar organized flow of content and shall include the following elements:
 - a. The training instructors shall start each video session with a similar introduction including statement of the project name, topic of the training session, name of the instructor, name of the instructor's company, and contact information for obtaining service for the equipment/system (name of service company, location of service company, and phone number for service calls),
 - b. Edited video recording of the Owner training and demonstration session,
 - c. Edited video recording of the question and answer period for the training session,
 - d. Edited video recording of the site walk portion of the training session,
 - e. Video recording of the specific equipment and identification of specific components, by the training instructor, to orient the viewer regarding what the equipment looks like in its installed condition as well as identification of the equipment's major elements.
4. The training videos shall be edited by the videographer to provide a smooth flow of the video presentation as well as to edit out extraneous materials, for example the recording of the transit of participants during the site walk, or other materials that would not be appropriate to include or do not add value to the final video product.
5. If the Instructor does not have full knowledge of the project or how the equipment fits into the building systems, the Design-BUILDER shall provide personnel who have expert knowledge regarding the equipment and the project, to assist the instructor and the videographer in the recording phase. This person will act as a liaison between the instructor and the videographer to ensure that the training instructor provides a comprehensive training presentation, including nuances of how the equipment fits into the project, and ensure that the videographer captures all of the content necessary to produce a comprehensive training video. This personnel shall also assist the videographer in the editing phase to provide technical knowledge, as necessary to ensure the accuracy of the video content.
6. The Owner shall provide final review and approval of the training video materials. The Design-BUILDER shall edit and revise the content according to the Owner's review comments. The Owner reserves the right to reject the materials based on their opinion of poor video quality, poor audio quality, or insufficient training content.
7. The Design-BUILDER shall provide the training videos in ".mp4" electronic file format in order to be compatible with the video playback software used by the Owner.

PART 3 - EXECUTION

3.1 OWNER TRAINING SCOPE

- A. The Owner Training Session scope shall be provided by the Design-BUILDER and reviewed by the Owner. At a minimum, the session list will include, but not limited to the following:
 1. Loading Dock Equipment
 2. Waste Compactors
 3. Elevators

4. Environmental Controls
 5. Environmental Monitoring System
 6. Facility Monitoring System
 7. Low Voltage Electrical Power
 8. Electrical Power Monitoring and Control
 9. Medium Voltage Switch Gear
 10. Low Voltage Switch Gear
 11. Automatic Transfer Switch
 12. Interior Lighting
 13. Exterior Lighting
 14. Fire Alarm System
- B. The hours listed in the table of training sessions above only include the minimum requirements for duration of training sessions to be provided by the instructors to the Owner. The Design-Builder shall also provide sufficient hours from the instructors and personnel with project expertise to provide coordination and assistance in production of the final training videos, including additional instructor and personnel with expertise hours as necessary to edit or provide revised content per the Owner's review comments.

END OF SECTION

GENERAL COMMISSIONING REQUIREMENTS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Comply with the commissioning provisions specified in this Section and elsewhere in the Contract Documents.
- B. General:
 - 1. Unless noted otherwise, functional performance tests (FPT) apply to all equipment and systems identified to be tested in the Contract Documents.
 - 2. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and for CAD (Computer Aided Drafting) Record Drawings, in accordance with Section 01 77 00 "Closeout Procedures."
 - 3. The duties of the Design-Builder's "Test Engineer" and Owner's "Commissioning Authority" are described in Section 01 75 00 "Test Engineer Services."
 - 4. The Design-Builder shall ensure that the Commissioning Authority, or other Owner-designated witness, is provided safe access to witness the performance of the equipment or systems being commissioned and is reasonably furnished ladders, scaffolding, and staging, if required, for witnessing.

1.2 COMMISSIONING DOCUMENTATION

- A. Commissioning Plan: The Design-Builder shall prepare and submit a "Commissioning Plan" that identifies how commissioning activities will be integrated into the construction Progress Schedule and how commissioning responsibilities are distributed. Include, as a minimum, the following:
 - 1. An organizational chart showing lines of communication and authority of the Test Engineer relative to key Design-Builder positions and to key Subcontractors
 - 2. Who will be responsible for producing the various procedures, reports, Owner notifications, and forms required by the Contract Documents
 - 3. List of all control systems software required by the Contract Documents
 - 4. The commissioning schedule
 - 5. Commissioning forms and other documentation
 - 6. Description of start-up and test procedures
 - 7. List of Subcontractors who will participate in each of the tests
 - 8. The instrumentation required for each test and who will provide the instrumentation
 - 9. Operational description for each test (This shall include, for example, the commissioning basis-of-design criteria provided by the commissioning authority, code requirements, the specifics of the equipment to be provided, sequences of operation, operating priorities, and other necessary information.)
 - 10. One-line system and riser diagrams
- B. Mechanical and Electrical Commissioning Binders (M&E): The M&E "Commissioning Binders" shall include the submittals, test equipment, commissioning procedures, installation verification audits, and FPT procedures documentation described in this Section.

1.3 SUBMITTALS

- A. Start-up plans: Submit start-up plans, with start-up test procedures and documentation forms, for the equipment and systems for which a start-up is specified in the Contract Documents. Start-up plans shall include the following:
 - 1. Start-up schedule
 - 2. Names of firms/individuals required to participate
 - 3. Detailed start-up procedures

GENERAL COMMISSIONING REQUIREMENTS

4. Start-up forms
 5. Operations and maintenance product data
- B. Start-up installation verification audit report: Submit installation verification audit reports prior to start-up of equipment and systems for which a start-up is specified in the Contract Documents. Identify:
1. Equipment and/or systems, to be started-up;
 2. Prestart-up tests performed, including manufacturer's factory tests;
 3. Deficiencies noted;
 4. Corrective action taken; and
 5. Dates and initials of persons making the entries.
- C. Start-up deficiency report form: Submit start-up deficiency report forms within five (5) days following the start-up of each equipment or system to report any deficiencies discovered in conjunction with start-up. Identify:
1. Equipment and/or systems started-up;
 2. Location and identification of the deficient equipment and/or materials;
 3. Date of observation and initials of observer;
 4. Deficiencies noted;
 5. Corrective action taken; and
 6. Date of correction and initials of the person making the correction.
- D. Test equipment identification list: Submit a list of all test equipment used in commissioning, sorted according to intended use. Provide an updated list, if any equipment is added to the commissioning, while testing is in progress. The list shall include the following information:
1. Manufacturer
 2. Model number
 3. Serial number
 4. Date of most recent calibration
 5. Range
 6. Accuracy
 7. Resolution
 8. Intended use
- E. Testing, Adjusting and Balancing (TAB) progress reports: Submit weekly TAB progress reports after TAB activities have begun. Identify the following:
1. Systems or subsystems for which preliminary balancing is complete
 2. Systems or subsystems for which final balancing is complete
 3. Status of deficiencies and balancing problems encountered, including corrective actions taken
 4. Updated schedule of remaining TAB activities
- F. FPT procedure documentation: Submit FPT procedure documentation for FPT specified in the Contract Documents. The documentation shall include the following:
1. FPT procedure description
 2. Procedures that are based upon the actual equipment and/or systems configuration
 3. The value for all set points and inputs, positions of adjustable devices, valves, dampers and switches
 4. The acceptable test range for each FPT
 5. Updated one-line system and riser diagrams
 6. An alphanumeric designator for each procedure
 7. Reference to the applicable Specifications section upon which the procedure is based
- G. FPT data forms: Submit FPT data forms to document the equipment or systems FPT specified in the Contract Documents.

GENERAL COMMISSIONING REQUIREMENTS

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1. Identify each FPT data form by a unique designator, consisting of an applicable FPT procedure designator followed by a dash and digit suffix to distinguish multiple repetitions of the same procedure.
 2. The FPT data form shall identify:
 - a. Who needs to be in attendance for the tests, including but not limited to, Subcontractors, Commissioning Authority or other Owner-designated witness, regulatory agencies, and others as appropriate; and
 - b. The sequence of the tests to be performed.
 3. Include space to record the following:
 - a. Description of the procedure
 - b. Whether the form is for a retest of a failed procedure
 - c. Identification and location of the equipment being tested
 - d. Identification of instrumentation used, by type and serial number
 - e. Observed conditions at each step of the procedure
 - f. Acceptable results, as specified
 - g. Date of the test
 - h. Names of technicians performing the procedure
 - i. Name and signature of the Design-Builder's Test Engineer
 - j. Name and signature of the Commissioning Authority or Owner-designated witness
 - 1) Signature of witness shall only indicate concurrence with reported results and observations. Acceptance of the results will be reported separately by the Commissioning Authority after review of the FPT data forms.
- H. FPT deficiency report forms: Submit FPT deficiency report forms at the end of each day for all tests in which acceptable results were not achieved during the day. When corrections have been completed, update the FPT deficiency report form. FPT deficiency report forms shall record the following:
1. Associated FPT data form number and description
 2. Equipment identification and location
 3. Date of test
 4. Name of person reporting the deficiency
 5. Description of the observations associated with the failure of the test
 6. Cause of the failure, if apparent at the time of the test
 7. Date and description of corrective action take
 8. Name and signature of person taking corrective action
 9. Schedule for retest
- I. One-line system and riser diagrams: Submit one-line system and riser diagrams with the Commissioning Plan, updated one-line system and riser diagrams with the FPT procedure documentation, and as-built one-line system and riser diagrams with the final M&E Commissioning Binders. One-line system and riser diagrams shall be submitted for the following, when included in the work of the Contract Documents:
1. Owner-provided one-line system and riser diagrams in CAD format for Design-Builder's use:
 - a. Hot water heating
 - b. Domestic water
 - c. Steam and condensate
 - d. Chilled water
 - e. Condenser water
 - f. Supply air
 - g. Return air
 - h. Exhaust air
 - i. Electrical normal and emergency power
 2. Subcontractor-provided one-line system and riser diagrams CAD Shop Drawings, for Design-Builder's use:

GENERAL COMMISSIONING REQUIREMENTS

- a. Environmental control systems (ECS)
- b. Fire alarm/smoke evacuation/life safety graphics and riser diagrams
- c. Lighting control system diagrams
- d. Electrical distribution equipment and spot or network substations schematic diagrams

PART 2 - PRODUCTS**2.1 TEST EQUIPMENT**

- A. Provide industry standard test equipment required for performing the tests specified in the Contract Documents.
- B. 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 in good repair and operational condition throughout the duration of use on this Project
 - 4. Be recalibrated/repared if dropped or damaged in any way since last calibrated
- C. For all temperature measurements, including air, liquids, and surfaces of pipes and components, use appropriate probes that meet the following requirements:
 - 1. Range: Minimum +14°F to 248°F
 - 2. Type: Thermometer, digital electronic
 - 3. Minimum accuracy: +/- 0.5°F
 - 4. Calibration Interval: Per manufacturer instruction, not to exceed every twelve (12) months.
- D. For hydronic systems pressure and differential pressure measurement instruments, the test equipment shall meet the following requirements:
 - 1. Range: 0 to 30 psi (1 pound per square inch), 0 to 60 psi, and 0 to 200 psi
 - 2. Type: Calibrated test gauges, 3 inch, or electronic digital device (TSI Performance Measurement Tools or similar) meeting accuracy and calibration interval requirements.
 - 3. Minimum accuracy: 2% with a gauged scale; 3% with an electronic reading
 - 4. Calibration interval: Per manufacturer's recommendation, not to exceed every twelve (12) months.
 - 5. Note: Use lowest range instrument or scale
- E. For air pressure measurement instruments, the test equipment shall meet the following requirements:
 - 1. Range: 0 to 1 inch WC (water column), 0 to 4 inch WC, 0 to 10 inch WC
 - 2. Type: Use properly leveled and zeroed manometer, magnehelic or electronic instrument meeting accuracy requirements
 - 3. Minimum accuracy for electronic devices: 2% with a magnehelic reading; 3% with an electronic reading
 - 4. Calibration interval for electronic devices: Per manufacturer's recommendation, not to exceed every twelve (12) months
 - 5. Note: Use lowest range instrument or scale
- F. Refer to electrical inspection, calibration, and testing requirements for instrumentation related to electrical systems and equipment.

GENERAL COMMISSIONING REQUIREMENTS**PART 3 - EXECUTION****3.1 COMMISSIONING PROCEDURE**

- A. Sequence of testing: Commissioning shall proceed from lower to higher levels of complexity. For each system, testing at the lower level shall be completed prior to starting the next higher level of tests. In general, the order of testing, from lowest to highest is as follows:
 - 1. Static tests (e.g., duct leakage tests)
 - 2. Motors, actuators, sensors, and other system components requiring start-up and FPT
 - 3. Point-to-point (PTP) testing
 - 4. Balancing
 - 5. System functional performance tests
 - 6. Cross-systems functional performance tests
- B. Retesting: Repeat, at no additional cost to the Owner, the complete functional test procedure for each test in which acceptable results are not achieved. Repeat tests until acceptable results are achieved. Fill out a new FPT data form for each retest.
- C. Correction of deficiencies:
 - 1. Correct FPT deficiencies promptly and schedule retest.
 - a. Corrections during FPT are generally prohibited to avoid consuming the time of personnel waiting for the test, but not involved in making the correction. Exceptions will be allowed if the cause of the failure is obvious and corrective action can be completed in less than five (5) minutes. If corrections are made under this exception, the failure shall be noted on the FPT data form. A new FPT data form, marked "retest", shall be submitted after the correction has been made. The entire FPT procedure shall be repeated.

3.2 INSTALLATION VERIFICATION AUDIT

- A. Conduct an installation verification audit before equipment or system start-up begins. The audit shall include, but not be limited to, a check of the following equipment or systems:
 - 1. Piping specialties, including balance, control, and isolation valves
 - 2. Ductwork specialty items, including turning devices; balance, fire, smoke and control dampers; and access doors
 - 3. Control sensors by type and locations
 - 4. Piping, valves, starters, gauges, thermometers, and other components of the Work specified for formal start-up in the Contract Documents
 - 5. Accessibility to equipment in 1 - 4 above
 - 6. Verification of final programmed variable frequency drives (VFD) settings
- B. If any part of the Work is found to be incomplete, inaccessible, incorrect, or non-functional, the Design-Builder shall make note of deficiencies, and correct deficiencies before system start-up work proceeds.
- C. Coordinate with the electrical testing contractor (ETC) for the audit of electrical systems required by the Contract Documents.

3.3 TESTING, ADJUSTING, AND BALANCING (TAB)

- A. Complete all PTP testing prior to start of TAB.
- B. Coordinate and perform air and hydronic balancing. Advise the TAB firm when systems are complete and ready for balancing. Start TAB as early as possible following system start-ups

GENERAL COMMISSIONING REQUIREMENTS

and component FPT, in order to be essentially complete prior to system FPT. Coordinate TAB activities with other construction schedule activities.

- C. Verify completion of PTP testing and the accuracy of the TAB work prior to commencing any FPT activities which may be adversely affected by incomplete PTP testing and improper balancing.

3.4 FUNCTIONAL PERFORMANCE TEST PROCEDURES

- A. FPT procedures must confirm the performance of systems to the extent required by the Contract Documents.
 - 1. Emphasis shall be placed on testing procedures which will conclusively determine actual system performance and compliance with the design.
- B. FPT procedures shall demonstrate the actual performance of specified safety shut-offs in a real or closely simulated condition of failure. Failure conditions shall include adequate oil pressure, proof-of-flow, non-freezing conditions, maximum head pressure, and other conditions common to the equipment.
- C. Systems may include safety devices and components that control a variety of equipment operating as a system. Interlocks may be hard-wired or installed via software. FPT procedures shall demonstrate these interlocks.

3.5 ECS SOFTWARE REVIEW

- A. Review ECS software and required ECS cross-systems software routines prior to the installation of control devices. The review shall include:
 - 1. Obtaining ECS program documentation
 - 2. Review of the programming approach
 - 3. Interface with other systems, including but not limited to:
 - a. Lighting
 - b. Fire alarm
 - c. Security
 - d. Clock
 - e. Emergency generator monitoring
 - f. Sump pumps
 - g. Distributed and mechanical utility metering
- B. Discrepancies in programming approaches shall be resolved with the Owner to provide the most appropriate, simple, and straightforward approach to software routines.

3.6 COMMISSIONING MEETINGS

- A. The Design-Builder shall participate in the following meetings with the Commissioning Authority. Other Subcontractors may, at Owner's sole discretion, be required to attend as necessary.
 - 1. Pre-commissioning kick-off meeting
 - 2. Commissioning meetings described in Section 01 31 19 "Project Meetings"
 - 3. ECS software review, and design intent clarification meeting
 - 4. Preliminary O&M Manual review meeting

3.7 EQUIPMENT OPERATING INSTRUCTIONS AND TRAINING AGENDA

- A. Each training session shall include an agenda addressing the following:
 - 1. Introduction of presenters

GENERAL COMMISSIONING REQUIREMENTS

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2. Using the O&M information:
 - a. What is the equipment
 - b. Basic operating procedures (including start-up/shut-down)
 - c. Preventative maintenance procedures
 - d. Troubleshooting procedures
3. What does it do, or serve
4. Any special features
5. Safety precautions
6. Maintaining warranties, guarantees, and warranty periods
7. Instruction on how to use proprietary instrumentation or operating equipment
8. Recommended spares
9. Review of start-up reports and FPT results
10. Jobsite walk-through

END OF SECTION

BUILDING EXTERIOR ENCLOSURE COMMISSIONING**PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes requirements for nonstructural commissioning of the building exterior enclosure, including but not limited to the following:
1. Below-grade construction, including foundation walls, horizontal plazas, slabs-on-grade and associated waterproofing.
 2. Above-grade construction, including exterior wall systems and assemblies, weather barriers, low-slope roofing, and glazed window systems
 3. Interface conditions (flashings, expansion joints, and sealant) between each of the materials, components, and systems that compose the above- and below-grade building exterior enclosure
- B. The following are common abbreviations used in this specification section.
1. BECx Building Enclosure Commissioning
 2. BECx OPR Building Enclosure Commissioning Owner's Performance Requirements
 3. BES-D Building Enclosure Specialist – Design Builder's Designer of Record
 4. BES-Cx Building Enclosure Specialist – Commissioning
- C. The materials, components, systems, and assemblies that compose the above- and below-grade building exterior enclosure will be evaluated and tested as outlined in this section as well as in accordance with each of the technical sections associated with the design and construction of the building exterior enclosure.
- D. The requirements of this section shall in no way relieve the Design-Builder and other parties of their respective contractual obligations to the Owner for meeting the specified performance requirements.

1.2 RELATED SECTIONS:

- A. Specification section related to the BECx requirements:
1. 03 30 00 – Cast-in-Place Concrete
 2. 03 37 13 – Shotcrete
 3. 03 41 00 – Precast Structural Concrete
 4. 07 13 00 – Sheet Waterproofing
 5. 07 13 54 – Thermoplastic Sheet Waterproofing
 6. 07 14 00 – Fluid-Applied Waterproofing

BUILDING EXTERIOR ENCLOSURE COMMISSIONING

7. 07 21 00 – Thermal Insulation
8. 07 25 00 – Weather Barriers
9. 07 41 13 – Metal Roof Panel
10. 07 42 13 – Metal Wall Panels
11. 07 52 16.13 – Modified Bituminous Membrane Roofing – Torch Down
12. 07 62 00 – Sheet-Metal Flashing
13. 07 72 30 – Roof Hatches and Vents
14. 07 90 05 – Joint Sealers – Base Building and Exterior
15. 08 43 13 – Aluminum Framed Storefronts
16. 08 80 00 – Glazing
17. 28 36 00 – Electronic Moisture Detection and Monitoring

1.3 RESPONSIBILITIES

A. Responsibilities of parties in the BECx process are summarized in the following articles.

1. Design-BUILDER Designer of Record
 - a. Provide appropriate information to the BES-D and BES-Cx regarding the BECx process.
 - b. Participate in BECx-related meetings and assist in the enforcement of contract documents and BECx requirements in the specifications.
 - c. Review product submittals and shop drawings for conformance with the design intent.
 - d. Periodically visit the site during construction and provide feedback to the BES-D, BES-Cx, and Owner.
 - e. Review building enclosure maintenance and renewals plans submitted by the Contractor.
2. Design Builder BES-D
 - a. Review product submittals and shop drawings for conformance with the design intent.
 - b. Provide review of all building envelope work during construction and provide feedback to the Owner, BES-Cx, and Design-BUILDER Designer with daily reports of observations with text and photographs. Document all work, including work both in and not-in compliance with the project documents.
 - c. Perform or coordinate BECx related inspections and testing as required in the specifications.
 - d. Maintain an outstanding issues log (BECx Issues Log) with items identified that are not in conformance with the project specifications and coordinate with the Design-BUILDER to sign-off on repaired items.

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- e. Review building enclosure maintenance and renewals plans submitted by the Design-Builder.
- 3. BES-Cx
 - a. Track product submittals, shop drawings, and Requests for Information (RFI), including Design-Builder Designer and BES-D comments, and review for conformance with the BECx OPR.
 - b. Review daily reports from BES-D during construction for compliance with the BECx OPR.
 - c. Review the project construction schedule for conformance with the OPR and BECx activities.
 - d. Oversee BECx-related inspections and testing.
 - e. Review building enclosure maintenance and renewals plans submitted by the Design-Builder.
- 4. Owner
 - a. Participate in BECx-related meetings.
 - b. Review building enclosure maintenance and renewals plans submitted by the Design-Builder.
- B. Design-Builder Responsibilities
 - 1. Coordinate with the BES-D, the BES-Cx, the Design-Builder Designer of Record, and the Owner regarding ongoing building enclosure construction and testing and provide access to work.
 - 2. Include all BECx-related tasks as specified in each individual specification section within the construction schedule. Notify the Owner, Design-Builder Designer of Record, BES-D, and BES-Cx in writing of any BECx-related tasks that will impact the overall project schedule.
 - 3. Provide qualified personnel to assist with BECx testing as specified in all related individual specification sections.
 - 4. Submit a copy of the general Design-Builder's project and site-specific quality assurance program to be implemented for construction for review by the Design-Builder's Designer of Record, the Owner, and the BECx team prior to beginning construction and prior to the kickoff meeting of the BECx process.
 - 5. Participate in pre-construction meetings with the Owner, Design-Builder's Designer of Record, BECx team, mechanical commissioning agent, and manufacturer's technical representatives. The pre-construction meeting shall include scheduling of and procedures for all BECx activities related to the scope of work to be performed.
 - 6. Furnish copies of all shop drawings, manufacturer's literature, installation instructions, maintenance information, schedules, warranties, or other information specified for every component used in the construction of the building enclosure.
 - 7. Construct on-site mock-ups as identified in individual sections of the specifications. Mock-ups shall be constructed by Design-Builder Trade Partners responsible for the remainder of the project. Any deficiencies noted by the BES-D, BES-Cx, Design-Builder's Designer of Record, or Owner shall be remediated and all corrective action incorporated into the remainder of the building.

BUILDING EXTERIOR ENCLOSURE COMMISSIONING

8. Hold meetings at appropriate milestones with the BES-D and BES-Cx, Design-Builder's Designer of Record, Owner and any Trade Partners to discuss the BECx Issues Log, activities, testing, and construction schedule.
9. Participate in maintenance orientation and inspection with each building staff group as identified by the Owner.
10. Provide a systems manual as part of the project record closeout documentation. A systems manual shall be developed for each major building enclosure system. The systems manual shall include the following:
 - a. As-Built Drawings – Include a copy of all details and drawings issued as addendums or change order directives. Any deviations shall be clearly marked in red.
 - b. Specifications for the Project - Include all accepted product substitutions and any additional specifications issued as addendums or change order directives.
 - c. Change Orders – Include a copy of all accepted change orders.
 - d. Shop Drawings – Include all approved shop drawings for each product requiring shop drawings, including any markups or comments.
 - e. Warranties – Include warranties for all products as specified in each individual specification section.
 - f. Testing Reports – Include copies of all BECx inspection and test reports.
 - g. Master Product List – Summarize all products used on the project for construction of the building exterior enclosure including:
 - 1) Product name
 - 2) Product manufacturer
 - 3) Catalog or other applicable number for ordering
 - 4) Manufacturer's contact information, including the contact information for the technical representatives, including one national contact and one regional technical representative contact
 - 5) Product color
 - 6) Supplier contact information
 - 7) Product installation instructions, including installation instructions supplied with any of the shop drawings that indicated field-installed items
 - 8) Manufacturer's product maintenance guide
 - 9) Manufacturer's checklist for periodic review of the product indicating how often the product should be checked and the process for implementing a repair

PART 2 - PRODUCTS – NOT USED**PART 3 - EXECUTION****3.1 FIELD TESTING****A. Parties responsible for testing:**

1. Testing agency approved by the Owner. May be BES-D or other third party consultant.
2. Parties responsible for witnessing testing:

BUILDING EXTERIOR ENCLOSURE COMMISSIONING

- a. BES-Cx and Design-Builder's Designer of Record
 - b. Design-Builder and any Trade Partners involved in the construction of the tested assembly
- B. Assemblies and testing requirements:
- 1. Testing protocol is identified in each individual specification. The following assemblies require field testing:
 - a. 07 13 54 – Thermoplastic Sheet Waterproofing (See paragraph 2 below)
 - b. 08 43 13 – Aluminum-Framed Storefronts
 - c. 28 36 00 – Electronic Moisture Detection and Monitoring
 - d. Whole Building Air Barrier Testing
 - 2. Below-Grade Waterproofing Testing Requirements (07 13 54 – Thermoplastic Sheet Waterproofing)
 - a. Testing protocol of the below-grade waterproofing system (Specification Section 07 13 54 – Thermoplastic Sheet Waterproofing) includes, but is not limited to:
 - 1) Deactivating the temporary dewatering system prior to activating the permanent dewatering system to expose a portion of the below-grade waterproofing to hydrostatic conditions.
 - a) Deactivation of the temporary dewatering system shall occur anytime following placement of the roof topping slab.
 - b) Following deactivation, it is anticipated that it will take XX days for the groundwater elevation to rise.
 - c) Following rise of the groundwater elevation, the dewatering system shall remain off for an additional 28 days.
 - d) Interior finishes shall not be installed until the test is complete.
 - e) Below-grade walls shall be regularly inspected for water leakage.
 - f) Any leaks through the waterproofing system and walls shall be addressed by the waterproofing manufacturer promptly to avoid delaying installation of interior finishes.
 - 2) Randomized testing of the leak detection system installed on the interior side of the below-grade walls.

END OF SECTION