



AMERICAN UNIVERSITY
DESIGN STANDARDS
CONSULTANT GUIDE

CONSULTANT GUIDE

GENERAL

MASTER PLANNING

American University undergoes a rigorous strategic planning process to match strategies, programs and facility improvements to the mission of the University. Consultants should avail themselves of information about current initiatives and campaigns during the design process. Campus information is available at the main university website www.american.edu.

A listing of departmental contacts to request information on current Master Plans pertinent to design and construction is available on the website at American University Design and construction website at www.american.edu/standards. Direct specific questions about university master plan requirements to Planning and Project Management or the assigned Project Manager.

UTILITIES AND SYSTEMS

Master planning is essential to the long-term reliability, operability, flexibility and efficiency of our systems. Facilities Management has developed a utilities master plan committed to district heating and cooling whenever practical. Consultants shall work with Facilities Management to become familiar with these and other departmental campus plans.

Energy conservation and efficiency of mechanical and electrical systems is critically important to the university. A strategic objective for designs is supporting Energy Star ratings for our systems and facilities. The Consultant should not base design equipment/system selections solely on Energy Star or initial cost.

The Consultant may prepare a Life Cycle Cost Analysis (LCCA) in the early design stages and present the LCCA to the Project Manager and Director of Energy and Engineering for review and/ or approval. The university defines LCCA as the total cost to operate and maintain a piece of equipment, product or system over its useful life, including the cost of procurement. Additionally, high-energy system equipment such as HVAC chillers and pumping systems, require a Present Worth Analysis (PWA) over the projected life cycle. Both types of studies shall consider the time value of money and discount all future cash flows to present.

DESIGN QUALITY

At American University (AU), each project has its own unique, programmatic and contextual requirements. The Consultant shall take into consideration the location of the project and shall design with a full understanding of the unique surroundings. All design elements must be carefully explored with long-term goals in mind (projected life of facility, equipment, and systems).

New facilities will be designed with a minimum rating of LEED® Gold. Existing facilities



will establish LEED® ratings targeting the same as practical, based on the current condition and the extent of renovation required. Energy Star rating will also be evaluated.

American University requires that the Consultant adhere to the latest edition of the AU Design and Construction Standards. The latest version of the AU Design and Construction Standards, which includes this Design Consultants Guide, is available at the website www.american.edu/standards.

Exceptions may be made on a case-by-case basis by requesting approval in writing from the Design Standards Committee (Chaired by Facilities Management's Director of Energy & Engineering). The University's Project Manager must maintain documentation for any exceptions.

The Consultant is expected to explore and present options toward making a recommendation for a design solution. There are no pre-established design styles or solutions for any project. Additional information applicable to design development of the project general requirements and construction documents is on the web site above under the CSI Divisions tab.

A detailed comparison and lifecycle economic analysis between various design options should be prepared where appropriate. Their use in determining the design solution shall be coordinated with AU's project manager and key stakeholders from the operations team. Design concepts shall incorporate the latest available technology wherever possible including the LEED® rating system.

DESIGN PROCESS

The design team shall establish and submit to the university's project manager a schedule identifying specific milestones, approval requirements, and the time necessary, after the project is approved, for design and/ or construction. The design team shall coordinate proposed projects with appropriate university reviewers, officers or departments to receive approval to continue. The Consultant shall prepare appropriate presentation materials to convey the design concepts at each phase.

AESTHETIC CONSIDERATIONS

The Consultant shall become knowledgeable with sustainable planning principles that have been established for the American University campus. This information is contained in the following documents (available as appropriate via AU's project manager):

- Campus Plan 2021
- Zoning Order approving the Campus Plan
- Related planning documents from the university where appropriate

The following general design principles have evolved over the years at the university:

- On or near the Freidheim Quadrangle, enhancement rather than dramatic



departure from existing design is highly preferred.

- When selecting exterior building materials, approvals from the University's Project Management must be secured prior to proceeding with further design development.
- Provision for future expansion should include flexibility for institutional programming changes and departmental master plan implementation.
- The American University campus is a certified arboretum. Each project shall be designed with limited tree removal and impact on traditionally forested areas.

UNIVERSITY RESPONSIBILITIES

American University's project manager may provide the following information or services:

1. Scope for design services
2. Project budget and schedule
3. Drawings of existing facilities and information pertinent to building services and utilities
4. American University Design and Construction Standards
5. Coordination of drawings distributed for in-house reviews
6. Coordination of in-house reviews
7. Coordination of user/occupant reviews
8. Coordination of interior design-related needs
9. Coordination of user/occupant moves
10. Coordination of university approval and/or committee reviews
11. Building information access for all design phases
12. Access to existing building systems archive (blueprints, specifications, etc.)
13. Information on commissioning requirements and responsibilities

DESIGN SUBMITTALS

The Consultant shall develop for the university's project management and maintenance units' review and approval schematic design, design development and construction documents unless otherwise noted in the design RFP.

Documents shall establish the scope, relationship, forms, size and appearance of the project in accordance with the requirements of all Agreements.

Pre-design, programming and feasibility studies are not required, unless specifically requested by the university's project management.

The Consultant shall provide design calculations for review upon request. A tabulation of gross, net, and assignable square foot building areas shall be submitted with each design phase and shall follow FICM (Facilities Inventory and Classification Manual) methodology. The latest edition of the American University Design and Construction Standards shall be



used by the Consultant throughout the design process. Use of this document does not relieve the Designer of Record of the responsibility for the final design in accordance with the Project Agreement and with professional standards of practice.

Design submittals to the university's Project Manager at each phase of design shall consist of multiple sets of drawings and specifications (including electronic copies).

The Consultant shall submit design schedules to AU's project manager. When projects involve interruptions of existing building operations or major utility usage, the Consultant shall be responsible for discussing the required outages and service interruptions with Facilities Management during each phase of the design. The Consultant will establish schedule requirements for these interruptions that may adversely affect campus services or ongoing operations. A brief description of the restrictions and their basis is required.

Schematic Design - Shall include architectural plans of each floor, including those below grade, all elevations, and typical building section and preliminary analysis and evaluation of LEED® criteria.

Design Development - Participation in or development of and verification with project team of the Owner's Project Requirements and specifications outline as required by the RFP or design contract. The specifications in this phase shall identify all significant architectural, mechanical and electrical materials and equipment in CSI format and how it conforms to the LEED criteria being sought for the project.

Construction Drawings (100%) - Shall reflect an expansion of the schematic design phase and shall establish the final scope, form and size of the project.

EQUIPMENT PROCUREMENT

The university may elect to purchase equipment directly for some projects and will, in such cases, require the Consultant to assist in the preparation of equipment bid documents and bidding. The university's Project Manager will coordinate the equipment procurement and delivery schedule.

CONSTRUCTION AND CLOSE-OUT PHASES

After completion of punch-list items by the Contractor, the Consultant shall submit a report of field verification and status of items. This status report will be updated at regular intervals until all punch-list items are resolved to the university's satisfaction.

Review operating and maintenance manuals submitted by the Contractor for completeness. These manuals shall include all pertinent information to successfully operate and maintain all equipment related to the project

SUBSTITUTION PROCEDURES

ACTION SUBMITTALS

- A. Substitution Requests: Submit electronically each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number, title, and Drawing numbers and titles.
 1. Substitution Request Form: Use form attached at end of this Section.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed for other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for



substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is compatible with other portions of the Work.
 - b. Requested substitution has been coordinated with other portions of the Work.
 - c. Requested substitution provides specified warranty.
 - d. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.



REQUEST FOR SUBSTITUTION FORM

1. Date: _____ Request No: _____
2. Project Name: American University, Project Name.
3. Specification Reference: _____
4. Description of specified product or system: _____
5. Trade name, model number, and name of proposed substitution:
(List Original and Proposed information)

6. What effect does substitution have on applicable code requirements?

7. Differences between proposed substitution and specified item? *(Use attachment for additional space, if required.)*

8. Manufacturer's warranty on proposed and specified items are:
Same Different
(Explain on attachment.)
9. Reason for requesting substitution:
Cause Convenience

10. Monetary considerations:
Specified Product \$ _____
Proposed Substitution: \$ _____
11. Undersigned shall pay for changes to the building design, including engineering and detailing costs, caused by the requested substitution .
12. Enclosed data consists of:
Catalog Drawings Samples Tests Reports
13. List local vendors and supplier representatives:

14. List availability of maintenance service and replacement materials.

14. State effects of substitution on construction schedule and changes required in other work or product:



15. State effects of substitution on project sustainability goals:

16. Any license fees or royalties: Yes No

UNDERSIGNED certifies:

- \$ Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- \$ Same warranty will be furnished for proposed substitution as for specified product.
- \$ Same maintenance service and source of replacement parts as applicable is available.
- \$ Proposed Substitution will not affect or delay Progress Schedule.
- \$ Cost data as stated above is complete. Claims for additional costs related to accepted substitution that may subsequently become apparent are to be waived by the Contractor.
- \$ Proposed substitution does not affect dimensions or functional clearances.
- \$ Payment will be made for changes to building design, including architectural or engineering design, detailing, and construction costs caused by proposed substitution.
- \$ Coordination, installation, and changes to the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:

For use by Architect:

Signature _____

Accepted: Accepted as Noted:

Firm _____

Not Accepted: Received Too Late: Date

Address _____

Date _____

Remarks: _____

Telephone _____

Approved by (C.M.)

By: _____

LIST OF ATTACHMENTS:

END OF FORM



PROJECT MANAGEMENT AND COORDINATION

GENERAL

DIGITAL PROJECT MANAGEMENT PROCEDURES

Web-Based Project Software: Use Contractor's web-based Project software site (Procore) for purposes of hosting and managing Project communication and documentation until Final Completion at which time all digital data shall become property of the Owner.

SUBMITTAL PROCEDURES

GENERAL

SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 14 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead-time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
- B. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
 5. Submit product schedule in the following format:
 - a. PDF electronic file.



QUALITY REQUIREMENTS

GENERAL

CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: The Architect & Design Engineer shall initiate discussion between the Owner and the Design Team to codify the Contractor's Quality Control oversight requirements during the project's construction phase. During these QC efforts and in most cases, the Contractor's QC Manager can also act as site superintendent. This is also left to the discretion of the Owner and the Design Team.

QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 2. Engage a qualified testing agency to perform these quality-control services.
 - 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified report of each quality-control service.
 - 5. Testing and inspecting requested by the Contractor and not required by the Contract Documents are Contractor's responsibility.
- B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect, Commissioning Authority and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which situations tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified report of each test, inspection, and similar quality-control service through Contractor.



5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- D. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections.
- E. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of report.
- F. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with the Contractor's construction schedule. Update as the Work progresses.
1. **Distribution:** Distribute schedule to Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

TEMPORARY FACILITIES AND CONTROLS

GENERAL

USE CHARGES

- A. **General:** Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction.
- B. **Sewer Service:** Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. **Water Service:** Owner will pay water-service use charges for water used by all entities for construction operations. Contractor shall install approved DC Water meter.



- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without payment of use charges. Provide connections and extensions of services as required for construction operations.

INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Safety Plan: Show emergency contacts, rally points, evacuation routes, hot work program, lock out tag out requirements, pedestrian controls, delivery and project access routes, and identification of On Site Safety Supervisor. Plan must comply with OSHA or local jurisdiction requirements, whichever is more stringent
- C. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
- D. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, timesteps, graphic elements, and message content.
- E. LEED Erosion and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- F. Dust and HVAC Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

QUALITY ASSURANCE

- A. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PRODUCTS

MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.
- C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.
- D. Wood Enclosure Fence: Plywood, **8 feet (2.4 m)** high, framed with four 2-by-4-inch (50-by-100-mm) rails, with preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.
- E. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- F. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

TEMPORARY FACILITIES

- A. Common Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings. Keep the office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no less than one receptacle on each wall. Furnished room



- with conference table, chairs, and 4-foot (1.2-m-) square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment is necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
 - 7. Provide data/internet connectivity to support owner staff requirements
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- 1. Store combustible materials apart from building.

EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel oil heaters with individual space thermostatic control.
- 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
 - 3. LEED Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

EXECUTION

TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
- 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
- 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service, meter, and distribution piping in sizes and



pressures adequate for construction.

- D. Water Service: Connect to Owner's existing water service facilities and install an approved DC meter. Clean and maintain water service facilities in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for the use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Toilets: Use of Owner's existing toilet facilities if approved, as long as facilities are cleaned and maintained daily by the contractor in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- F. Temporary Heating and Cooling: Unless Owner authorizes use of permanent HVAC system for temporary heating or cooling, provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Methods of temporary heating shall be approved by governing agencies having legal jurisdiction. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary ventilation and dehumidification systems when required to reduce ambient and substrate moisture levels to the level required to allow installation or application of finishes and their proper curing or drying.
- G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, noise, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in the area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.



1. Install electric power service overhead unless otherwise indicated.
- J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating the entire system.
 2. Install lighting for Project identification sign.
- K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install Wi-Fi access equipment or land-based data line(s) for each field office.
1. At each field office entry, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.

SUPPORT FACILITIES INSTALLATION

General

- A. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according.
- B. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- C. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
- D. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in the same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extending temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 1. Coordinate elevations of temporary roads and paved areas with permanent



- roads and paved areas.
 - 2. Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing.
 - 3. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course.
- E. Traffic Controls: Comply with requirements of authorities having jurisdiction.
- 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- F. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
- 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
- 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required informing the public and individuals seeking entrance to the Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are legible at all times.
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 7300 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
- 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
- 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage Owner's elevator Installer



to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- M. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction
- N. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided the stairs are protected and finishes restored to new condition at time of Substantial Completion.

SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.



- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- G. Site Enclosure Fence: [Before construction operations begin] [Prior to commencing earthwork], furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Maintain security by limiting the number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
 - 1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 2. Paint and maintain appearance of walkway for duration of the Work.
- L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- M. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with 20 gauge steel studs, gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors.



Maintain water-dampened foot mats in vestibule.

2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 3. Insulate partitions to control noise transmission to occupied areas.
 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 5. Protect air-handling equipment.
 6. Provide walk-off mats at each entrance through temporary partition.
- N. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.



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

OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial



Completion.

- D. Termination and Removal: Remove each temporary facility when the need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. The owner reserves the right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

PRODUCT REQUIREMENTS

GENERAL

PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrently with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.



EXECUTION

GENERAL

PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Do not hold waste materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.



- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

CLOSEOUT PROCEDURES

GENERAL

SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 1. Substantial Completion procedures.
 2. Final completion procedures.
 3. Warranties.
 4. Final cleaning.
 5. Repair of the Work.

ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 1. Certificates of Release: Obtain and submit releases from authorities having



- jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, compliance documents, and similar releases.
2. Submit closeout submittals, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material, including tools, spare parts, extra materials, and similar items, and deliver to location designated by American University Material Supply Manager. Label with manufacturer's name, model number, and American University Asset Identification Number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain American University Project Manager's signature for receipt of submittals and contractor shall transmit items to American University Material Supply Manager for final signature of receipt.
 5. Submit test/adjust/balance records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, the Architect will either



proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect and Commissioning Agent, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
 1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect and Commissioning Agent. A certificate copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 3. Submit pest-control final inspection report.
 4. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems including commissioning items.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.



- e. Page number.
4. Submit list of incomplete items in MS Excel, PDF electronic file, or other format acceptable to Architect.

SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Provide additional copies of each executed warranty to include in operation and maintenance manuals.
- E. Warranty Electronic File: Provide executed warranties and bonds in PDF format. Assemble complete executed warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 1. Submit on digital media acceptable to the Owner, and/or by uploading to web-based project software site.

EXECUTION

FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills,



- stains, and other foreign deposits.
- c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- e. Remove snow and ice to provide safe access to building.
- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- h. Sweep concrete floors broom clean in unoccupied spaces.
- i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- k. Remove labels that are not permanent.
- l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
- p. Clean, repair, or replace damaged or soiled ceilings, ceiling tiles, and fixtures. Painting of ceiling tiles and/or grid is not acceptable.
- q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- r. Leave Project clean and ready for occupancy.

REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements.



Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
3. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use
5. Replace defective and noisy starters in fluorescent to comply with requirements for new fixtures.

OPERATION AND MAINTENANCE DATA

GENERAL

CLOSEOUT SUBMITTALS

- A. Provide content for each manual as specified in individual Specification Sections. Submit reviewed manual content formatted and organized as required by this Section.
 1. The owner will comment on whether the content and organizational format of operation and maintenance submittals is acceptable.
 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 1. Searchable PDF with table of contents
- C. Initial Manual Submittal: Submit draft electronic copy of each manual at least 30 days before commencing demonstration and training. The Owner will comment on whether the general scope and content of the manual are acceptable.
 1. Correct or revise each manual to comply with Owner comments.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 14 days before commencing demonstration and training.

FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and



equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.

- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Construction Manager.
 - 7. Name and contact information for Architect.
 - 8. Name and contact information for Commissioning Authority.
 - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 10. Cross-reference to related systems in other operation and maintenance manuals.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include a comprehensive table of contents for all volumes in each volume of the set.

EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

- B. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.

- C. Type of Emergency: Where applicable for each type of emergency indicated



below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures including alarms.
 6. Restart and Release requirements.

SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.



- C. Descriptions: Include the following:
 - 1. Product name and model number. Use designations for products indicated on Contract Documents.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.

- D. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Adjustment parameters.
 - 6. Instructions on stopping.
 - 7. Normal shutdown instructions.
 - 8. Seasonal and weekend operating instructions.
 - 9. Required sequences for electric or electronic systems including alarms.
 - 10. Special operating instructions and procedures.

- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

- F. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

- G. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

- H. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.



2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- I. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
 - J. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
 - K. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
 - L. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
 - M. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.
 - N. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 1. Do not use original project record documents as part of maintenance manuals.

PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish



incorporated into the Work.

- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. 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.
- D. 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.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PROJECT RECORD DOCUMENTS

GENERAL

CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and 1 of file prints.
 - 2) Submit record digital data files including and 1 set of plots.
 - 3) Architect will indicate whether general scope of changes,



additional information recorded, and quality of drafting are acceptable.

- b. Final Submittal:
 - 1) Submit PDF electronic files of scanned record prints and 1 sets of prints.
 - 2) Submit recorded digital data including .dwg files and complete Revit file and 1 set(s) of record digital data file plots.
 - 3) [Print] [Plot] each drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

RECORD DRAWINGS

- A. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - 1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 - 2. Format: Annotated PDF electronic file with comment function enabled.
 - 3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - 4. Refer instances of uncertainty to Architect for resolution.
 - 5. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 01 3100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings



- into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 3. Note related to Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until the end of the Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Include significant changes in the product delivered to the Project site and changes in manufacturer's written instructions for installation.
 2. Note related Change Orders, record Specifications, and record Drawings where applicable.
- C. Format: Submit record Product Data as annotated PDF electronic file.
 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.



GENERAL COMMISSIONING REQUIREMENTS

GENERAL

- A. Reference the Commissioning Specifications for General Commissioning Requirements.