

**SECTION 01 78 23 – OPERATION AND MAINTENANCE DATA****PART 1 - GENERAL****1.1 RELATED SECTIONS**

- A. Section 01 77 00 Closeout Procedures
- B. Section 01 78 39 Project Record Documents

**1.2 SUMMARY**

- A. This section provides the requirements for preparation and final delivery to the Owner of the following information as a precedent to approval of the Contractor's final pay application:
  - 1. Operation and Maintenance (O&M) Manual
  - 2. Mechanical Controls Diagrams
  - 3. Operation and Maintenance Training Videos
  - 4. Approved Fire Protection Shop Drawings

**1.3 SUBMITTALS**

- A. All digital media shall be submitted on flash drive/thumb drive.
- B. Zip files are not permitted.
- C. All PDF files shall be text searchable.

**1.4 OPERATIONS AND MAINTENANCE MANUAL****A. General**

- 1. The purpose of the O&M Manuals is to facilitate the proper long-term care of new or renovated facilities by providing knowledge of material and system components of these facilities.
- 2. For projects that require the construction or substantial renovation of more than one building, create one O&M Manual for each building.
- 3. Assemble submittal data for O&M Manual during the normal project submittal process.
- 4. Use the Construction Specifications Institute (CSI) Master Format numbering system for section numbers and section titles of O&M Manual.
- 5. Submit O&M Manual in one bookmarked PDF file.
- 6. Use the following file naming convention for O&M Manual: BLDG # – ARCHITECT PROJECT # – PROJECT SECTION or PHASE # – OM. PDF. For example: 135-9706-01- OM.PDF.
- 7. Submit a draft copy of the O&M Manual for approval by the Owner, Architect, mechanical & electrical engineer, and the commissioning authority prior to preparation of the final copy. The draft copy of the O&M Manual is due by the Substantial Completion date of the project.
- 8. Upon final approval by the Architect, deliver three copies of final, labeled disk(s) to Owner. If applicable, deliver one additional copy of final, to the commissioning agent.

**B. Home Page**

- 1. Opening tab shall be designated the Home Page of the O&M Manual and shall include the name of the facility, date completed, name, address, telephone and e-mail address of the Contractor.
- 2. Home Page shall contain tabs, or bookmarks, that provide primary access to all other sections of the O&M Manual.

**C. Table of Contents**

1. Provide a bookmarked section containing a Table of Contents.

**D. Project Directory**

1. Provide a directory of all members of the Project team.
2. Provide one bookmarked section for the Contractor. Provide the name, telephone number & e-mail address of all key personnel. Include principal in charge, project manager, job superintendent. If applicable, include assistant project manager, assistant superintendent or other personnel key to the coordination of construction.
3. Provide one bookmarked section for the Architect. Provide the name, telephone number & e-mail address of the project manager, project architect, and other key members of the Architect's team.
4. Provide one bookmarked section for each engineering consulting firm. Engineering disciplines to be included are Civil, Structural, Mechanical, Plumbing, and Electrical. If applicable, include other engineering disciplines involved in the submittal review process. Provide the name, telephone number & e-mail address of the project manager and other key members of the engineer's team.
5. If applicable, provide one bookmarked section for the commissioning agent. Provide the name, telephone number & e-mail address of the project manager and other key members of the commissioning agent's team.
6. Provide one bookmarked section containing the Subcontractor and Vendor Directory. This Directory should appear alphabetically using the name of the subcontractor or vendor. Include all major trade contractors and vendors that were a part of construction. Include a person that is a future point of contact for each trade contractor or vendor. Include the generic trade, i.e. Window Supplier, Electrical Contractor, etc., associated with each subcontractor or vendor. Provide the address, telephone number and e-mail address of each listed subcontractor or vendor.

**E. Specification Sections**

1. Include all specification sections listed in the Table of Contents of the Project Manual.
2. Bookmark each specification section separately.
3. Within each specification section provide the following:
  - a. On a separate page, list the name, address and telephone number of the suppliers of all key materials for that section.
  - b. Copies of approved submittals for all materials and systems that are part of construction. Do not provide copies of detailed shop drawings such as steel framing, concrete reinforcing steel, stone, precast concrete, embed attachments, ornamental metals, casework, millwork, and window systems. See Section 01 78 39 Project Record Documents for shop drawing submittal requirements.
  - c. Statements of any color selections of manufacturers' materials that were approved during construction.
  - d. Copies of any manufacturers' or installers' recommended maintenance instructions or guidelines that were furnished during construction.
  - e. Copies of any special warranties that were required and furnished by suppliers during construction.

4. In Section 08 – Openings, provide specific information from the window manufacturer that clearly identifies each individual window type utilized in the facility.
  5. In Section 09 – Finishes, provide a copy of the architect’s final finish selections. Include all approved changes to this schedule that occurred during construction. Provide paint schedules and all formulas for custom mixed paint colors.
  6. Before preparing final draft of O&M Manual, request from the Owner any information concerning Owner furnished materials or systems. Give particular attention to Section 11 – Equipment, and Section 12 – Furnishings.
  7. In each Section 21 through 25, provide the following:
    - a. Approved submittals for all materials and systems that are part of a fully functional and operating facility.
    - b. Manufacturers’ or installers’ recommended maintenance instructions or guidelines that were furnished during construction.
    - c. Special warranties that were required and furnished by suppliers during construction.
    - d. Documented test results for any piece of equipment or system that was required during construction.
    - e. Independent certification of material integrity or system functionality that was required during construction.
  8. In Section 23 – HVAC, provide the final approved HVAC Test and Balance report.
  9. In Section 25 – Integrated Automation, provide the final approved control sequences and diagrams.
  10. In each Section 26 Electrical , Section 27 Communications, and Section 28 Electronic Safety and Security, provide the following:
    - a. Approved submittals for all materials and systems that are part of a fully functional and operating facility.
    - b. Manufacturers’ or installers’ recommended maintenance instructions or guidelines that were furnished during construction.
    - c. Special warranties that were required and furnished by suppliers during construction.
    - d. Documented test results for any piece of equipment or system that was required during construction.
    - e. Independent certification of material integrity or system functionality that was required during construction.
    - f. A copy of all electrical panel circuit breaker schedules.
  11. In Section 26 05 73 – Overcurrent Protective Device Coordination Study, provide the Overcurrent Protective Device Coordination Study furnished during construction.
  12. In Section 28 31 00 – Fire Detection and Alarm, provide the signed fire alarm system NFPA Record of Completion.
  13. In Section 32 80 00 – Irrigation, provide approved submittals of all materials and equipment employed to construct irrigation system. Provide the manufacturer or vendor supplied Controller Programming and Operating Guide.
  14. In Section 32 90 00 – Planting, provide the landscaping contractor’s written maintenance guidelines for all plant materials.
- F. **Close-out Documentation**
1. Provide a bookmarked section containing the executed Certificate of Substantial Completion.
  2. Provide a bookmarked section containing the final Use and Occupancy Permit.
  3. Provide a bookmarked section containing signed Final Release of Liens received from each subcontractor.

4. Provide a bookmarked section containing signed Warranties and Guarantees required by the specifications and provided by manufacturers, vendors and installers.

### 1.5 MECHANICAL CONTROLS DIAGRAMS

- A. Provide one set of laminated half-size drawings of the mechanical control diagrams for each mechanical room. Grommet drawings and hang adjacent to each Building Automation Control Panel.

### 1.6 OPERATION AND MAINTENANCE TRAINING VIDEO

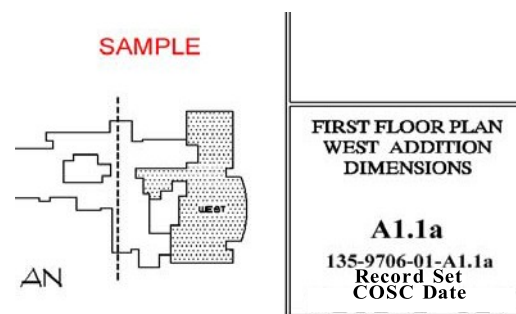
- A. Record all Operations and Maintenance Training in video format.
- B. Record all training sessions including, but not limited to, mechanical, electrical, HVAC controls, and fire alarm systems.

### 1.7 APPROVED FIRE PROTECTION SHOP DRAWINGS

- A. Submit approved fire protection shop drawings in original CAD File format and Plot File format.

#### 1. CAD File Format

- a. All digital CAD related information, is a true representation of actual conditions as verified in the field including but not limited to:
  - 1) Source drawings
  - 2) Reference drawings
  - 3) Font libraries
  - 4) Custom line style/codes
- b. Provide the complete REVIT model.
- c. Submit drawings in AutoCad DWG, Microstation DGN, or Autocad/Microstation Compatible DXF format drawn in model space to a 1 to 1 scale.
- d. Submit each drawing as a separate file. All reference drawings shall be inserted as a permanent part of the CAD drawing.
- e. Use the following file naming convention for CAD Files: BLDG # – ARCHITECT PROJECT # – PROJECT SECTION or PHASE # – SHEET #.(file extension). For example: 135-9706-01-FP1.dwg.
- f. Use the following sheet naming convention for CAD Files: BLDG # – ARCHITECT PROJECT # – PROJECT SECTION or PHASE # – SHEET #.(file extension). For example: 135-9706-01-FP1
- g. File names and sheet names shall match.
- h. Each sheet shall include the term "RECORD SET", Certificate of Substantial Completion (COSC) Date, and the sheet naming electronically embedded and located within the title block as shown below.



**PART 2 – PRODUCTS**

Not Applicable

**PART 3 – EXECUTION**

Not Applicable

END OF SECTION