

**Jefferson County School District, R-1
Support Services**

TECHNICAL GUIDELINES

DIVISION 01 – GENERAL REQUIREMENTS

August 2026

Jefferson County School District, No. R-1 TECHNICAL GUIDELINES AUGUST 2026
Division 01 – General Requirements

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01 10 00 Summary - October 2010

- Division 01 General Requirements have an immense impact on direct and indirect project costs and obligations incurred by Jefferson County School District, R-1.
- Division 01 is not "boiler plate," but rather a very carefully crafted summary of requirements that govern all Divisions of work relevant to a specific project.
- Under-specifying in Division 01 can result in substandard project administration and unnecessary repetition or conflicts in other sections of the specifications.
- Over-specifying in Division 01 increases the potential for conflicts with the General and Supplemental Conditions of the Contract, and Agreements.
- Coordinate Summary issues with Jefferson County School District, R-1:
 1. General Conditions of the Contract
 2. District Project Manager during the entire project development process.

END SECTION 01 10 00

01 11 00 Summary of Work - October 2020

- Section 01 11 00 is required in the Project Manual to identify:
 1. Name of building(s) and address(es)
 2. Official and permanent project title, location code and project number, as assigned by Jefferson County School District R-1.
 3. Overview and summary of the scope of work covered by the Contract Documents
 - a. Include any specific requirements for existing furniture and staff relocations required as a result of the work.

END SECTION 01 11 00

01 11 16 Work by Owner - October 2010

- Section 01 11 16 is required in the Project Manual when the overall scope of work includes or requires coordination with work to be performed by Jefferson County School District, R-1.

END SECTION 01 11 16

01 11 19 Purchase Contracts - October 2010

- Section 01 11 19 is required in the Project Manual when the overall scope of work includes or requires coordination with purchase contracts.

END SECTION 01 11 19

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01 12 00 Multiple Contract Summary - October 2010

- Section 01 12 00 is required in the Project Manual when applicable.
- Jefferson County School District, R-1 can typically award separate contracts for systems and components
 1. See Section 01 31 00 – Project Management and Coordination
 2. See Data, Communications, and Alarm Diagram.
- Pre-Ordered Long Lead Systems/Components:
 1. Prohibited without prior approval of Jefferson County School District, R-1
 2. General Contractor includes pre-order items in Schedule of Amounts
 3. Jefferson County School District, R-1 pays for costs up to the point of cancellation.
- Pre-Purchased Long Lead Systems/Components:
 1. Not Recommended

END SECTION 01 12 00

01 14 00 Work Restrictions – August 2026

- Section 01 14 00 is required in the Project Manual.
- Access to Site:
 1. Arrange in advance with Jefferson County School District, R-1.
 2. Contract Documents need to define both physical and schedule limitations.
- Coordination with Occupants: Allow for continued occupancy of, access to, and egress from non-construction areas in compliance with applicable codes.
- Use of Premises: Per General Conditions
 1. Define Contract limits for work, access, staging, storage, etc.
 2. Non-school personnel are prohibited outside of designated contract areas at all times.
 3. For work in existing buildings, certain facilities may be made available to the General Contractor. Such spaces are to be vacated by the Stipulated Completion Date, regardless of authorized adjustments to construction schedule.
 4. Use of the following are prohibited unless authorized in writing by Jefferson County School District, R-1:
 - a. Elevators and lifts
 - b. Air conditioning
 - c. Toilet Facilities

END SECTION 01 14 00

01 18 00 Project Utility Sources – August 2026

- Section 01 18 00 is required in the project manual when the project scope includes coordination with utility purveyors.
- Identify project-applicable utilities, including entity, contact person, telephone, fax, email, and mailing addresses.
 1. Water

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2. Sanitary Sewer
 3. Storm Sewer
 4. Gas
 5. Electricity
 6. Telephone/Data
 7. CATV
 8. Fiber Optic
- The contractor is responsible for providing documentation to the consultant and owner in support of the requirements for the Xcel Energy rebate programs.
 - Asbestos abatement activities may require uninterrupted power and water 24 hours a day.
 1. Any action that will impact power or water during abatement must be carefully coordinated well in advance with Jefferson County School District, R-1 and the Abatement Contractor.

END SECTION 01 18 00

01 20 00 Price and Payment Procedures - October 2010

- Section 01 20 00 or individual narrow scope sections are required in the Project Manual to define procedures for allowances, unit prices, alternates, substitutions, value analysis, contract modification, and payment.
- Coordinate Price and Payment Procedures with Jefferson County School District, R-1:
 2. General Conditions of the Contract
 3. District Project Manager during the entire project development process.

END SECTION 01 20 00

01 21 00 Allowances - October 2010

- Cash Allowances are not recommended.
- When approved by Jefferson County School District, R-1:
 1. Submit copies of invoices for items governed
 2. Include material only in allowance amount.
 3. Labor, equipment, overhead and profit are to be included in the base bid.
 4. Balance the difference between the cash allowance and actual final invoice cost by means of a Change Order.

END SECTION 01 21 00

01 22 00 Unit Prices - October 2010

- Limit unit prices to items of variable/indeterminate scope with the following controls:
 1. Precise definitions of unit and included/excluded scopes are required.
 2. Unit prices are inclusive of direct and indirect costs such as labor, material, equipment, overhead and profit.

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3. Establish, define, and enforce mechanisms for measurement and verification.
4. Document actual quantities by means of a formal Change Order.

END SECTION 01 22 00

01 23 00 Alternates - October 2010

- Bid Alternates:
 1. Alternates with a value less than 0.5% of the base bid are usually not worthwhile.
 2. Minimize the number of trades involved in each alternate.
 3. Add alternates are preferred over deduct alternates.
 4. Maximum of 5 bid alternates per project, unless otherwise authorized by Jefferson County School District, R-1.
 5. List and select alternates in priority order to prevent post-bid challenges
- Bidder Alternates: Per Instructions to Bidders only.
 1. No submittal requirements; include in Bid Form.
- Contractor Alternates: Per General Conditions.

END SECTION 01 23 00

01 24 00 Value Analysis - October 2018

- Application of sustainability criteria is mandatory per 01 81 00 Facility Performance Requirements.
- • Application of life cycle criteria is mandatory per 01 90 00 Life Cycle Activities.

END SECTION 01 24 00

01 25 00 Substitution Procedures - October 2010

- Per General Conditions of the Contract
- Substitutions will not be considered unless the level of technical, specification, and graphic information is equivalent to that included in the contract documents.
- See also 01 62 00 Product Options

END SECTION 01 25 00

01 26 00 Contract Modification Procedures - October 2010

- Per General Conditions of the Contract
- Request for Information (RFI):
 1. Required
 2. Written only
- Change Orders:
 1. Use Jefferson County School District, R-1 standard form.
- Field Order / Architect's Supplemental Instructions / Directives / Interpretations:

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1. Written only

END SECTION 01 26 00

01 29 00 Payment Procedures - August 2015

- Per General Conditions of the Contract
- See Contractor Payment Application process diagram.
- Submit typed or printed information on Jefferson County School District, R-1 standard Application for Payment, sub-contractor payment record, Schedule of Values, & Current Certificate of Insurance (dated within 30 days of Payment Application date).
 1. Multiple projects within a single contract/agreement require a separate Application for Payment and Schedule of Amounts for each project site.
- Schedule of Values
 1. Submit typed or printed information on Jefferson County School District, R-1 standard form.
 2. Format:
 - a. Identify each line item with number and title of each specification section listed in the Table of Contents of the Project Manual.
 - b. Include a separate line item for overhead and profit.
- Progress Payments
 1. Submit no more frequently than monthly intervals.
 - a. Submit end of fiscal year Application for Payment no later than July 9 for all work completed through June 30.
 2. Format and content should be identical to Schedule of Values
- Final Payment:
 1. Submit 2 separate applications as follows:
 - a. 100% completion, less retainage
 - b. Retainage release:
 - (1) Per General Conditions of the Contract
 - (2) Release of retainage will not occur until all required project close-out documents are submitted and approved.

END SECTION 01 29 00

01 30 00 Administrative Requirements - October 2010

- Section 01 30 00 or individual narrow scope sections are required in the Project Manual.
- Coordinate Administrative Requirements during the entire project development process with Jefferson County School District, R-1:
 1. General Conditions of the Contract
 2. District Project Manager
- Submit one copy of each administrative document to the Jefferson County School District, R-1 Construction District Project Manager.
 1. Submit in electronic format

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END SECTION 01 30 00

01 31 00 Project Management and Coordination – August 2015

- Coordination:
 1. Contract Documents must clearly define and specify unambiguous responsibilities in a project-specific matrix based upon the following:
 - a. Project Management and Coordination Matrix
 2. Related Sections:
 - a. 01 91 00 Commissioning
 - b. Data, Communications, and Alarm Diagram.
 3. Wiring in divisions other than Division 26 - Electrical is limited to 50 volts or less except:
 - a. Division 23 – Control Wiring for Heating Ventilating and Air Conditioning
 - b. Division 25 - Integrated Automation up to 120 volts is to be performed by a journeyman electrician.
- Qualification requirements may be imposed upon one or more of the following, per individual specification sections:
 1. Fabricator
 2. Installer
 3. Manufacturer
 4. Manufacturer Facilities / Support
 5. Supplier
 6. Testing Agency
- Commissioning
 1. Jefferson County School District, R-1 routinely performs or contracts Commissioning of systems in Facility Services Subgroup (Divisions 21 – 28) and reserves the right to perform or contract similar quality control measures at any time on systems in any other Division.
- Project Meetings
 1. A Pre-Construction Conference is mandatory for all Jefferson County School District, R-1 capital projects, regardless of contract amount or scope.
 2. Weekly Project meetings are mandatory for all Jefferson County School District, R-1 capital projects.
 3. The General Contractor is responsible for preparing and distributing Meeting Minutes to participants.
 4. Jefferson County School District, R-1 Facility Planning and Construction Department agenda format is recommended.
 5. Commissioning coordination meetings:
 - a. Pre-installation conferences:
 - (1) Scoping meeting:
 - (a) Includes all members of the design and construction team
 - (b) Purpose:
 1. Review commissioning process

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2. Agree on:
 - a. Scope of Work
 - b. Tasks
 - c. Schedules
 - d. Deliverables
 - e. Responsibilities for Commissioning plan implementation
 - b. Required during:
 - (1) Equipment start-up
 - (2) Functional performance testing
 - c. Include Mechanical Contractor
- Job Site Information Sheet
 1. Required prior to issuance of Notice to Proceed.
 - a. On Jefferson County School District R-1 standard form
 - Recorded logs:
 1. Updated daily are mandatory for the following administrative activities:
 - a. Regulatory Requirements; permits and approvals
 - b. Quality Control; testing and inspection
 - c. Requests for Information (RFI) and responses
 - d. Requests for changes or substitutions
 - e. Architect's Supplemental Instructions / Field Orders / Proposal Requests
 - f. Change Orders
 - g. Submittals
 2. Submit in electronic format
 - Project Web Site:
 1. No requirements

END SECTION 01 31 00

01 32 00 Construction Progress Documentation – August 2026

- Per General Conditions of the Contract
- Construction Photographs:
 1. Comprehensive pre-construction photographs and videos are mandatory.
- Periodic Site Observation:
 1. Per Agreement
- Progress Schedules and Reports
 1. Submit schedule chart with separate listings for each major trade or operation
 2. Interval:
 - a. Weekly update with a minimum 3 weeks look-ahead.
 3. Indicate:
 - a. Complete sequence of construction by activity
 - (1) Identifying work of separate stages and other logically grouped activities.
 - b. Projected percentage of completion for each item of work at the time of each Application for Progress Payment.
 - c. Action dates for:

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- (1) Shop drawings
 - (2) Product data
 - (3) Samples
 - (4) Other required submittals
- 4. Show product delivery dates, including those furnished by Owner or Others.
- 5. Show school-specific activity dates, such as student registration, back-to-school night, summer schools, principal and staff return dates, and other scheduled activities that can affect or otherwise have an impact on the work schedule.
- 6. Identify as a separate line item:
 - a. Test and Balance
 - b. Commissioning
 - c. Closeout
- Scheduling of Construction
 - 1. This is a critical issue, especially at occupied sites and facilities
 - 2. Coordinate with Jefferson County School District, R-1 District Project Manager
 - 3. Contract Documents should indicate critical dates for work under separate contract (such as asbestos abatement).

END SECTION 01 32 00

01 33 00 Submittal Procedures – August 2015

- Coordinate submittal requirements with Jefferson County School District, R-1:
 - 1. General Conditions of the Contract
 - 2. District Project Manager during the entire project development process.
 - 3. Refer to specific requirements for submittals in other sections of Division 01 and in the individual specification sections of Divisions 02 through 33 of these Technical Guidelines.
- Coordination:
 - 1. 01 91 00 Commissioning
 - 2. XX 08 00 Commissioning, within individual narrow scope sections of Project Manual
- Submittals constitute an implied statement by the Sub- and General Contractors that submitted items:
 - 1. Have been reviewed and approved by the Sub- and General Contractor
 - 2. Have been verified and coordinated with specifications, measurements, conditions, and relevant criteria of the Contract Documents.
 - 3. Can be fabricated and delivered to the project site within the proposed Project Schedule.
- Submittals are not Change Orders.
 - 1. The purpose of submittals is to demonstrate that the Contractor understands the design concept and confirms such through proposed detailing, fabrication, and installation methods.
- No Finish selection will be made until all appearance-related submittals have been received.

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- Under no circumstances shall un-reviewed or unapproved submittals be used in conjunction with the work.
- Review by the design consultant and Jefferson County School District, R-1 shall not relieve the Contractor from full compliance with the Construction Documents.
- Label each submittal to clearly identify:
 1. Submittal, including specification section number.
 2. Project
 3. Architect or Prime Consultant
 4. Owner: Jefferson County School District, R-1
 5. Manufacturer
 6. Contractor
 7. Subcontractor
 8. Supplier, if different from Subcontractor
- Submittals are required to identify deviations from the Contract Documents.
- Provide space for review notes.
- Re-submittals:
 1. Clearly identify changes made since previous submittal
- Product Data (electronic format):
 1. Submit manufacturer's standard catalog cuts, brochures, technical data, and specifications
 2. Mark each copy to identify project-specific applicable products, models, options and other data
 3. Supplement manufacturers' standard data with information unique to the work.
- Shop Drawings
 1. CAD generated plots are the preferred format for all Shop Drawings and are required per Section 01 78 39.
- Samples:
 1. Finishes:
 - a. Submit full range of manufacturers' standard colors, textures and patterns for Jefferson County School District, R-1 selection.
 2. Mockup:
 - a. Submit full or reduced sized samples to illustrate functional characteristics of the assembled product, with integral parts and attachment devices per specifications.
 - b. Window fenestration/exterior wall.
 - c. Roof coping
 - d. Other critical construction details
- Submittal process:
 1. Design Consultant forwards one set of approved submittals to Jefferson County School District, R-1 District Project Manager
 2. Include a summary / outline matrix of all submittal requirements of the Contract Documents in this section.
 3. Commissioning Submittal Requirements:
 - a. Submit one copy of standard submittals for equipment to be commissioned to Mechanical Engineer
 - b. Mechanical Contractor:

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- (1) May require additional documentation for the commissioning process
- (2) Receives written request for information from the Mechanical Engineer relative to specific equipment or system

END SECTION 01 33 00

01 35 00 Special Procedures – August 2015

- Alteration Project Procedures:
 1. Renovation and Reconstruction (including retrofit roofing projects):
 - a. Limit / contain smoke, dust, dirt, noise (including radios) to immediate work area.
- IBC Type V (wood framed) construction is prohibited for permanent Jefferson County School District, R-1 buildings without approval of Facilities Management and the District Project Manager.
- Environmental Procedures:
 1. Asbestos Abatement
 - a. Schedule Construction to allow for abatement work under separate contract.
 - b. Due to time constraints, abatement and construction may occur simultaneously in different work areas of the same building.
 - c. Maintain the integrity of containment or temporary dust barriers erected by the Abatement Contractor.
 - d. Air monitoring will be conducted both inside and outside the containment at all times during asbestos abatement activities.
 - e. Coordinate non-abatement construction activities that create dust or fumes with the Owner and the Abatement Contractor in order to avoid false air monitoring readings.
 2. Storm Water Management
 - a. Storm water management procedures (SWMP) shall comply with State of Colorado requirements
 - b. Currently the cities of Lakewood and Golden meet the EPA's requirements for NPDES permitting and developing a stormwater management program (MS4).
 - (1) City of Lakewood municipal requirements supersede State requirements for projects within the City of Lakewood.
 - (2) City of Golden municipal requirements supersede State requirements for projects between 0.5 and 5 acres within the City of Golden. For larger projects, City of Golden requirements are in addition to State requirements.
 - c. The (site) general contractor shall:
 - (1) Obtain all storm water permits required
 - (2) Construct protective measures.
 - d. The general contractor shall be responsible for:
 - (1) Complying with the provisions of the permit, including inspection and maintenance, until the permit is deactivated.
 - (2) The general contractor will be liable for any non-compliance notices or penalties issued by the State or municipality.

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- e. All runoff control items not supporting the final site drainage system shall be removed from the site prior to owner acceptance
 - f. General Contractor, Consulting Architect, Consulting Engineer shall conduct a walk through, with Construction Project Manager and Facilities Maintenance, of the site's stormwater drainage system covered by the SWMP prior to acceptance.
 - g. Deactivation of the construction activity permit requires prior approval by Jefferson County School District, R-1 Construction Management.
 - h. Consulting Architect and Engineer will recommend best management practices (BMPs) for the post-construction maintenance of the site's stormwater drainage system and a stormwater outfall map.
 - i. Jefferson County Public School District R-1 Department of Environmental Compliance 'Storm Water Management Program' (SWMP) also applies to construction and post-construction storm water management.
 - j. At the District's discretion a third-party SWMP inspector may be hired to work with the contractor and monitor compliance with the program.
- Security Procedures:
 - 1. Per General Conditions of the Contract
 - 2. Successful bidders will be required to complete Criminal Record Check, (Internet Name Check) on all employees who work on the site of the projects.
 - (1) Submit completed form to the District Project Manager.
 - b. Each Contractor will be responsible to adhere to any Federal, State or Local privacy and confidentiality requirements.
 - 3. Construction personnel are required to wear identification at all times while on Jefferson County School District, R-1 property.
 - 4. Contractor 24/7 contact information is required to be posted at the project site with a copy to the District Project Manager.

END SECTION 01 35 00

01 35 16 Special Procedures – Furniture and Equipment and Building Occupant Relocations – August 2020

- See Section 12 01 00 for furniture, fixtures, and equipment and staff moves and relocations required during construction.
- Coordinate with the District Project Manager for critical relocation schedules

END SECTION 01 35 16

01 40 00 Quality Requirements - October 2010

- Section 01 40 00 or individual narrow scope sections are required in the Project Manual.
- Coordinate Quality Requirements with Jefferson County School District, R-1:
 - 1. General Conditions of the Contract
 - 2. District Project Manager during the entire project development process.

END SECTION 01 40 00

01 41 00 Regulatory Requirements – August 2015

- For each project-applicable regulatory requirement, the contract documents are required to identify the
 1. Entity
 2. Contact person
 3. Telephone
 4. Fax
 5. Email
 6. Mailing address.
- The General Contractor is responsible for full compliance with applicable editions of codes and regulations with amendments, whether or not listed herein.
- Federal Regulatory Requirements and guidelines:
 1. Environmental Protection Agency
 - a. Asbestos Hazard Emergency Response Act (AHERA)
 - b. Cleanup
 - c. Hazardous Waste
 - d. Indoor Air Quality Tools for Schools (IAQ/TFS)
 - e. Lead
 - f. Mercury
 - g. Mold
 - h. Polychlorinated Biphenyls (PCB):
 - (1) Fluorescent lamp ballasts and HID capacitors or HID ballasts with internal capacitors dated 05-30-1979 or before and not labeled “NO PCB” may contain PCB.
 - (2) Coordinate disposal of these items with Jefferson County Public School District R-1, Department of Environmental Services.
 - i. Spills
 - j. Pesticide
 - k. Radon
 - l. Underground storage tanks (UST)
 - m. Volatile Organic Compounds (VOC)
 - n. Wastes, Debris
 - o. Wetlands
- 2. Occupational Safety and Health Administration (OSHA)
- 3. Americans with Disabilities Act (ADA)
 - a. ADA Architectural Guidelines (ADAAG),
 - b. ADAAG Recommendations for Accessibility Standards for Children's Environments
 - c. ANSI A117.1, and applicable codes.
- 4. U. S. Corps of Engineers
 - a. 404 Permit is required for work in or around natural watercourses.

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- Current State of Colorado Regulatory Requirements and Guidelines:
 1. International Building Code (IBC), latest adopted editions:
 - a. Colorado Division of Fire Prevention and Control, 690 Kipling Street, Suite 2000, Lakewood, Colorado 80215
 2. International Fire Code (IFC):
 - a. Enforced through the Colorado Division of Fire Prevention and Control.
 3. International Mechanical Code (IMC):
 4. Enforced through the Colorado Division of Fire Prevention and Control
 5. International Energy Conservation Code (IECC)
 - a. Enforced through the Colorado Division of Fire Prevention and Control
 6. International Plumbing Code (IPC):
 - a. Enforced through Examining Board of Plumbers, Department of Regulatory Agencies, 1560 Broadway, Suite 1350, Denver, Colorado 80202.
 - b. Note: Certain Water and Sanitation Districts reserve the authority to engineer service sizes, grease traps, and other components of the plumbing system.
 7. National Electrical Code (NEC):
 - a. Enforced through Department of Regulatory Agencies, State Electrical Board, 1560 Broadway, Suite 1350, Denver, Colorado 80203
 8. International Solar Energy Code (ISEC):
 - a. Enforced through the Colorado Division of Fire Prevention and Control.
 9. ANSI/ASME A17.1 Safety Code for Elevators:
 - a. Enforced through the Colorado Division of Oil and Public Safety.
 10. National Fire Protection Association (NFPA):
 - a. As referenced by one or more of the above state-adopted codes.
 11. Colorado State Board of Health, Consumer Protection Division
 - a. Enforced through Jefferson County Health Department:
 - b. "Rules and Regulations Governing Schools in the State of Colorado." (6 CCR1010)
 - (1) "Rules and Regulations Governing the Sanitation of Food Service Establishments in the State of Colorado."
 - c. Other regulations of the Colorado Department of Health as enforced by local Department of Health including but not limited to:
 - (1) Colorado Primary Drinking Water Regulations
 - (2) Water Quality - Cross Connection Control
 - (3) Asbestos
 - (4) Hazardous Materials
 - (5) Solid Waste
 12. Colorado Air Quality Control Commission (AQCC)
 13. Colorado Department of Transportation, "Manual of Uniform Traffic Control Devices" (MUTCD)
 14. State of Colorado Water Quality Regulations Water Quality Control Division
 - a. Stormwater: Discharge Permit System (CDPS) / Stormwater Management Plan (SWMP)
 - b. Construction dewatering
 - c. The General Contractor is responsible for maintaining best management practices (BMPs) for the full term of the stormwater permit.

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15. American Society of Mechanical Engineers (ASME) Boiler Code:
16. Enforced through Colorado Division of Oil and Public Safety
17. State of Colorado Geological Standards and Regulations:
 - a. Enforced through Colorado Geological Survey
 - (1) Review required for
 - (a) Raw land purchases
 - (b) New school construction
 - (c) Improvements to existing schools
 - (2) Submit site plan and geotechnical report for review and approval
18. Rules Regulating Child Care Centers
 - a. Enforced through The Division of Child Care, Colorado Department of Human Services, 1575 Sherman Street, Denver, Colorado 80203
19. Proof of worker citizenship.
 - a. Comply with applicable statutes.
20. Climbing/Traversing walls:
 - a. Coordination:
 - (1) Conform to current requirements of the Colorado Division of Fire Prevention and Control.
- Jefferson County Regulatory Requirements apply to projects in unincorporated areas.
 1. Zoning Ordinance
 2. Jefferson County Land Development Regulations
 3. Site Development Plan:
 - a. Submit as a courtesy
 4. Grading Permit:
 - a. Contact local jurisdiction
- Industry Standards
 1. Comply with industry standards identified in individual sections of these Technical Guidelines.
 2. Underwriters Laboratories (UL) label is mandatory for all electrical apparatus, equipment, and devices.
- Municipality Regulatory Requirements excluding City of Lakewood:
 1. Zoning Ordinance
 - a. Submit a site development to the Planning Commission plan for review and comment prior to construction of any building or structure.
 - b. Unless directed by the State, municipal and county zoning regulations have no jurisdiction over Jefferson County School District R-1.
 - (1) The District is required to consult with the Planning Commission having jurisdiction prior to acquiring a site in order that the proposed site shall conform to the adopted plan of the community insofar as is feasible.
 2. Curb Cut Permit
 - a. Coordinate with design and construction requirements of local jurisdictions for work in rights-of-way.
- City of Lakewood
 1. Special procedures according to the 1997 Intergovernmental Agreement with Jefferson County School District, R-1.

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- a. Grading permit
 - b. Erosion control permit
 - c. Drainage permit
2. Stormwater Management Ordinance supersedes state requirements.
- Other Regulatory Requirements
 1. Fire/Smoke Detection/Alarm System installation requires review and authorization by the local fire protection district unless the installer has a valid permit issued by the State Electrical Board for general electrical work
- State regulations may require other reviews based on project-specific scopes of work. Coordinate with Authorities Having Jurisdiction.

END SECTION 01 41 00

01 45 00 Quality Control – August 2019

- Inspection Flow Chart
- Jefferson County School District, R-1 reserves the right to procure qualified independent evaluation of any materials and workmanship in the project.
- Specifications should define:
 1. Criteria
 2. Limits
 3. Witnessing
 4. Correction of non-complying construction.
- Independent field and/or laboratory testing for construction quality control may be procured directly by Jefferson County School District, R-1 for the following list. This list may not be comprehensive; review each Section to determine testing and quality control specific to each project's needs. Other sections not listed below may include requirements for independent testing in coordination with the District Project Manager:
 1. 02 50 00 Site Remediation
 2. 02 80 00 Facility Remediation
 3. 03 30 00 Concrete slab to receive finish flooring
 4. 03 30 00 Cast-In-Place Concrete
 5. 03 40 00 Precast Concrete
 6. 04 20 00 Unit Masonry
 7. 05 05 00 Structural welding
 8. 09 80 00 Acoustics
 9. 23 21 00 Hydronic Piping: Joint integrity
 10. 31 23 00 Excavation and Fill
 11. 31 60 00 Special Foundations and Load Bearing Elements
 12. 32 10 00 Bases, Ballasts, Pavements

END SECTION 01 45 00

01 50 00 Temporary Facilities and Controls - October 2010

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- Section 01 50 00 or individual narrow scope sections are required in the Project Manual.

END SECTION 01 50 00

01 51 00 Temporary Utilities - October 2010

- Coordinate Temporary Utility requirements with Jefferson County School District, R-1:
 1. General Conditions of the Contract
 2. Facilities Team during the entire project development process.
- For general construction work in existing buildings, Jefferson County School District, R-1 usually provides the following utilities without charge to the Contractor:
 1. Gas
 2. Water
 3. Electricity
 4. Heat/normal ventilation (but not air conditioning)
- Use of sanitary sewer is permitted for normal wastewater only.
 1. The General Contractor is responsible for:
 - a. The full costs of cleanout and correction of related damage due to blockages.
 2. The General Contractor is responsible for temporary voice and data systems.
 3. Special attention is required for Asbestos Abatement projects.
- Coordinate utility services to project-related temporary buildings:
 1. Electricity
 2. Gas
 3. Paging
 4. Telephone
 5. Data
 6. Fire detection/alarm
 7. Security detection/alarm
 8. Water (as required)
 9. Sewer (as required)

END SECTION 01 51 00

01 58 00 Project Identification – August 2019

- A minimum of one (1) exterior sign is required for all capital projects over \$250,000 construction value. Confirm with Jeffco Schools: The District Project Manager may require site signage for projects of any value.
 1. 4 feet x 8 feet
 2. Mount on two posts
- Content and format
 1. Conform to graphics template provided by Jefferson County School District, R-1
 - a. Logo and colors
 - b. Facility name and/or project name

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- c. Design Consultant(s)
- d. General Contractor
- e. Source of funding
- f. Other information as directed by Jefferson County School District, R-1

END SECTION 01 58 00

01 60 00 Product Requirements - October 2010

- Section 01 60 00 and/or 01 61 00 is required in the Project Manual.
- Coordinate Product requirements with Jefferson County School District, R-1:
 - 1. General Conditions of the Contract
 - 2. District Project Manager / during the entire project development process.
- These Technical Guidelines assign each material, product and system to one of four categories as follows:
 - 1. Tier 1: Product/Model specific:
 - a. Proprietary; Sole source, closed specification restricted to specific products of specific manufacturers.
 - b. No substitutions or alternates.
 - 2. Tier 2: Manufacturer specific:
 - a. Proprietary; Restricted sources specification.
 - b. No substitutions or alternates.
 - 3. Tier 3: Performance criteria:
 - a. Unrestricted descriptive specification or reference standard.
 - b. Open to any materials, products, and systems that meet specified requirements.
 - 4. Tier 4: Commodity.
 - a. Unrestricted descriptive specification or reference standard.
 - b. Open to any materials, products, and systems.
- As a public entity, Jefferson County School District, R-1 seeks to procure products and materials through open, competitive bidding to the greatest degree possible.
 - 1. Jefferson County School District, R-1 is a conservative purchaser, preferring known or proven products and materials over unknown or experimental ones.
- Domestically manufactured products and materials are strongly preferred over those of foreign manufacture.
- Standard production materials, products, systems, and finishes are preferred over custom.
- Local product support is strongly preferred

END SECTION 01 60 00

01 62 00 Product Options – August 2018

- Coordination:
 - 1. Also see 01 60 00 Product Requirements

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- Materials, products, and systems identified as Tier 3 and 4 require no evaluation or approval of options.
- Options to Tier 1 and Tier 2 materials, products, and systems require formal approval.
 1. Formal approval is defined as written approval by the District Project Manager.
- Options will be evaluated according to the following criteria:
 1. Compliance with these Technical Guidelines and intended quality.
 2. Performance record in public schools in Colorado or adjacent states
 3. Life cycle cost
 4. Initial cost
 5. Availability / Impact on construction schedule
 6. Maintenance procedures, access, service, parts availability
 7. Risk / reward
 8. Compatibility with existing, including District-wide considerations.
 9. Ramifications for other components of the finished construction.
 10. Physical size, configuration for the intended use.
 11. Locally produced and supported.
- Product Substitution Procedures
 1. Substitutions are governed by the General Conditions of the Contract.
 2. References to "equal" or "approved equal" in the project specifications are prohibited unless the process governing consideration of such substitutions is defined in this section of the specifications.
 3. Product options and substitutions are categorically prohibited without the confirmation of compliance with project-specific:
 - a. Specifications
 - b. Measurements
 - c. Details and interfaces
 - d. Schedule implications
 - e. Physical conditions
 - f. Operation and maintenance requirements
 - g. Other relevant criteria of the Contract Documents
- Jefferson County School District, R-1 Request for Substitution form is required to evaluate Product Options proposed after the bid opening.

END SECTION 01 62 00

01 64 00 Owner-Supplied Products - October 2010

- Coordinate between Contractor and Jefferson County School District, R-1 District Project Manager.
- See Section 01 31 00 – Project Management and Coordination

END SECTION 01 64 00

01 70 00 Execution and Closeout Requirements - October 2010

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- Coordinate Execution requirements with Jefferson County School District, R-1:
 1. General Conditions of the Contract
 2. District Project Manager
 3. Section 01 77 00 – Closeout Procedures
 4. Sections 01 78 00 – Closeout Submittals

END SECTION 01 70 00

01 71 00 Examination and Preparation - October 2010

- Field-verify condition and performance of existing pavement, components, systems, lines, etc. before beginning demolition or new construction, including retrofit/remodeling projects.
- Advise Jefferson County School District, R-1 in writing of substandard conditions or performance that could adversely affect work in the Contract for Construction

END SECTION 01 71 00

01 73 29 Cutting and Patching - October 2010

- Coordinate in advance with Jefferson County School District R-1 Construction Project Manager:
 1. Scope
 2. Schedule
 3. Structure to be affected
 4. Utilities to be affected
 5. Hazardous material abatement
- Cutting of structural components is prohibited without the written authorization of a licensed structural engineer.
- Reconstruct the affected area to replicate the function and appearance of the original construction to the great extent possible.

01 74 00 Cleaning and Waste Management - October 2010

- Coordinate with CDPHE and Jefferson County School District, R-1 Department of Environmental Services.

01 75 00 Starting and Adjusting – October 2010

- Section 01 75 00 is required in the Project Manual
- Coordination:
 1. 01 91 00 Commissioning
- Start-up:
 1. Document all manufacturers' recommendations for:
 - a. Installation

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- b. Inspection
 - c. Start-up
- 2. Equipment shall not be temporarily started (for heating or cooling purposes) until:
 - a. Completion of all manufacturers' installation and start-up procedures
 - b. Moisture, dust and other environmental or building integrity issues have been addressed

01 77 00 Closeout Procedures – August 2026

- Jefferson County School District, R-1 expects to operate and maintain its facilities for a minimum of 50 years beyond the date of Final Acceptance.
 - 1. To be efficient, economical, and effective in this mission, it is imperative that the School District receive accurate and permanent "as constructed" records, in both electronic and reproducible formats, of every graphic and text document used directly or indirectly to execute the construction project.
- Section 01 77 00 is required in the Project Manual.
- Coordinate Closeout Submittal requirements with Jefferson County School District, R-1:
 - 1. General Conditions of the Contract
 - 2. Consultant Guidelines (particularly Formats)
 - 3. District Project Manager throughout the entire project development process.
 - 4. Construction Contract and Project Closeout diagram.
 - 5. 01 91 00 Commissioning
 - a. Requirements include receipt of approved commissioning documentation
- The mandatory sequence of events for acceptance and closeout of Jefferson County School District, R-1 capital construction projects is as follows:
 - 1. Final change orders are submitted and processed.
 - 2. Contractor's Inspection:
 - a. The Contractor personally inspects the work to certify completion of all contract requirements and identify deficiencies by discipline (i.e. Civil, Architectural, HVAC, Plumbing, Electrical, etc.).
 - (1) Mechanical Contractor submits to the General Contractor:
 - (a) Approved functional performance testing reports from the commissioning documentation.
 - 3. Written Notification of Project Completion:
 - a. The Contractor certifies inspection, acceptance, and suitability of the work for the Design Consultant's Final Inspection and attaches the Preliminary Punch List.
 - 4. Punch List Inspection:
 - a. Upon receipt of the Written Notification of Project Completion, the Design Consultant schedules a Punch List Inspection with the Contractor and District Project Manager to initiate Project Acceptance.
 - b. Partial Punch Lists by area of construction may be permitted with the approval of the District Project Manager.
 - 5. Punch List:

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- a. The Design Consultant prepares and distributes a written Report of Inspection summarizing the Punch List Inspection.
6. Notice of Completion:
 - a. Upon completion of items identified in the Punch List, the Contractor advises the Design Consultant in writing that the project is complete, inspected, and ready for the Final (Acceptance) Inspection.
 - (1) Includes submittal of the all requirements from 01 91 00 Commissioning
 - (a) Exceptions to this are any required seasonal or pre-approved deferred testing
7. Final (Acceptance) Inspection:
 - a. Upon receipt of the Notice of Completion, the Architect schedules a Final Acceptance Inspection with the Contractor and the District Project Manager.
8. Non-Asbestos Letter:
 - a. A final letter stating that no asbestos-containing materials were included in the project.
9. Project Closeout:
 - a. The Contractor executes requirements of Sections 01 78 00 through 01 79 00
 - b. Transmits closeout documents to the Prime Consultant.
10. Project Record Documents:
 - a. Design Consultant integrates Contractor information with other documentation of post-award changes, warranties, Operations and Maintenance data, and other closeout requirements of sections 01 78 00 – 01 79 00 and submits the record documents directly to the Facilities Archives.
11. Application for Payment for 100% Completion:
 - a. Contractor submits application for payment, minus retainage, per section 01 29 00.
12. Acceptance:
 - a. After all work and closeout submittals are executed to the satisfaction of the Design Consultant, the Design Consultant issues a written letter to Jeffco Schools certifying final completion and recommending acceptance.
 - (1) The letter of acceptance includes asbestos content certifications and the recommended date of acceptance.
13. Owner's Letter of Acceptance:
 - a. Department of Facility Planning and Construction issues a written letter to the Contractor confirming acceptance and acceptance date of the project.
14. Application for Payment of Retainage:
 - a. Contractor submits application for payment of retainage per section 01 29 00.
15. Final Payment:
 - a. Upon verification of the preceding items, the Design Consultant recommends Final Payment.
 - b. Jefferson County School District, R-1 issues Final Payment after a waiting period following the publications of Notices of Contractor's Settlement.

END SECTION 01 77 00

01 78 00 Closeout Submittals - October 2010

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- Refer to sections 01 78 13 – 01 79 00
- Coordination:
 1. 01 91 00 Commissioning
 2. 01 93 00 Operation and Maintenance

END SECTION 01 78 00

01 78 13 Completion and Correction List - October 2010

- Per General Conditions of the Contract and Section 01 77 00.

END SECTION 01 78 13

01 78 19 Maintenance Contracts - October 2010

- Per Section 01 77 00

END SECTION 01 78 19

01 78 23 Operation and Maintenance (O & M) Data - August 2019

- Process:
 1. Submit draft(s) within 90 days of contract execution
 2. Contractor submits Operation and Maintenance data to Design Consultant per Section 01 77 00
 - a. Contractor shall submit individual copies to Mechanical Engineer directly, in addition to the prime Design Consultant, to facilitate concurrent review.
- Format
 1. One single as-printed PDF version of the entire O &M Manual. PDF file shall be bookmarked reflecting Table of Contents.
 - a. Bookmarks identified by CSI Masterformat appropriate section number
 2. Indexed Adobe.pdf files are required.
 3. Equipment List:
 - a. Microsoft Excel (.xls)
- Contents
 1. Title Sheet:
 - a. “Operation and Maintenance Data and Instructions”
 2. Project Title
 3. Identification of project participants.
 - a. Include company name, the name of the business address, telephone, fax, and email address for the following:
 - (1) Architect
 - (2) Sub Consultant(s)
 - (3) Owner: Jefferson County School District, R-1
 - (4) Manufacturer(s)

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- (5) Contractor/ Construction Manager
- (6) Installing Subcontractor
- (7) Supplier, if different from Subcontractor
- (8) Maintenance contractor, if appropriate
- (9) Local source of supply for parts and replacement
- 4. Table of Contents for each volume
 - a. Arranged by specification division and section then presented alphabetically within each section.
- 5. Identify each product by:
 - a. Product name
 - b. Other identifying symbols consistent with the Contract Documents.
- 6. General catalog data sheets:
 - a. Include only those sheets pertinent to the installed product(s).
 - b. Annotate each sheet to clearly identify the installed product and data applicable to installation.
 - c. Delete or overwrite inapplicable information to create a true "as constructed" record.
- 7. Printed text to supplement product data and organize into a consistent format under separate headings for different procedures.
 - a. Provide logical sequence of instructions for each procedure.
- 8. List of manufacturers recommended spare parts and recommended quantities to be maintained in storage.
- 9. List proper procedures in event of failure
- 10. Itemize conditions which might affect validity of warranties or bonds
- 11. Drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams of devices installed.
 - c. Correct illustration of completed installation.
- 12. Diagrams and Charts
 - a. Each subcontractor's coordination drawings, and as-installed color-coded diagrams (required by contract and used in the project).
 - b. Charts of equipment with location and function of each.
- 13. Instructions for operation, adjustment, maintenance and repair of installed equipment and systems by Jefferson County School District, R-1 personnel.
- 14. Manufacturers' Manuals for Equipment and Systems including:
 - a. Emergency instructions
 - b. Operating instructions, Controls
 - c. Precautionary instructions, including special summer and winter operation
 - d. Recommended procedures for start-up, break-in, stop, shut down
 - e. Routine care
 - f. Alignment, adjusting and checking
 - g. Lubrication schedule and list of required lubricants
 - h. Filter cleaning/replacement schedule
 - i. Parts replacement schedule including predicted life
 - j. Guide to trouble shooting
 - k. Maintenance guide

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- l. Disassembly, repair, and reassembly
 - m. Description of unit and component parts
 - n. Maintenance parts list, complete with nomenclature and commercial part number of replaceable parts
 - o. Function, normal operating characteristics and limiting conditions of parts and assemblies
 - p. Performance curves, engineering data and tests for pumps larger than $\frac{3}{4}$ HP and fans greater than 1000 cfm; Curves shall include flow rate, pressure, HP, RPM, and efficiency.
 - q. Illustrations, assembly drawings and diagrams
 - r. Regulations, compliance issues
 - s. Water treatment
15. Equipment List
- a. Comprehensive list of equipment installed under Divisions 21-28
 - b. Used for integration with Jefferson County School District, R-1 asset tracking database.
16. Commissioning Information
- a. Mechanical Contractor is responsible for review of Operations and Maintenance data for commissioned systems, to include:
 - (1) Completeness of information
 - (2) Adherence to the requirements of the Project Manual
 - b. Mechanical Contractor may add materials and information which:
 - (1) Stress and enhance the importance of:
 - (a) System interactions
 - (b) System troubleshooting
 - (c) Long term preventive maintenance
 - (d) Long term operations
 - c. Review is in addition to Design Team review
 - d. Commissioning information shall be compiled and organized as noted above
 - (1) Commissioning manual summarizes the following elements of the commissioning process:
 - (a) Tasks
 - (b) Findings
 - (c) Documentation
 - (2) Commissioning report information:
 - (a) Addresses the actual performance of the building systems
 - 1. Compared to:
 - a. Design intent
 - b. Contract documents

END SECTION 01 78 23

01 78 29 Final Site Survey - August 2026

- A post-construction survey may be required for all capital projects where the scope of work includes sitework, required ADA surfaces, or alteration of the building footprint.

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1. Included in the General Contract for new buildings on new sites only.
 2. Separate contract for other projects where scope of work includes site work.
- When required, comply with survey criteria outlined in Consultant Guidelines, CG 007 Site Survey.
 - Submit with record documents per Section 01 77 00
 - Coordinate with the District Project Manager if required.

END SECTION 01 78 29

01 78 33 Bonds - October 2010

- Per Section 01 77 00

END SECTION 01 78 33

01 78 36 Warranties – August 2015

- Purchased manufacturer warranties are typically limitations of liability and are prohibited.
- Do not include Warranties and Bonds within Operation and Maintenance manuals. These should be located in Section 8 of the District's Project Manual.
- When provided, extended term warranties must comply with the following:
 1. Be underwritten by the product or system manufacturer.
 2. Provide coverage term from the date of project final acceptance.
 3. Provide full replacement product or material with no dollar limit.
 4. Incremental Warranties (i.e. "5 plus 5") are not acceptable.
- Process:
 1. Submit sample within 60 days of contract execution
 2. Contractor submits original and 2 copies to Design Consultant at closeout, per Section 01 77 00.

END SECTION 01 78 36

01 78 39 Project Record Documents – August 2015

- Field Record Documents
 1. Maintain at the job site one "As Constructed" active record copy of :
 - a. Contract Drawings
 - b. Project Manual
 - c. Specifications
 - d. Addenda
 - e. Shop Drawings
 - f. Change Orders and other modifications to the Contract

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- g. Field inspection reports, permits, approvals, test reports, certifications, and other documents used in the construction of the facility or the fabrication of its components and systems.
 - 2. Accurately mark these documents with all changes made during construction, using pencil or ink of a contrasting color.
 - a. Cable systems:
 - (1) Accurately indicate system status including terminations, routing, and labels.
 - 3. Store Project Record Documents apart from documents used for construction.
 - 4. Maintain Project Record Documents in a clean legible condition.
 - 5. Label each document "PROJECT RECORD COPY" in large, bold letters.
 - 6. Keep record documents current.
 - 7. Do not permanently conceal any work until required information has been recorded.
 - 8. Make the project record documents available at all times for the Owner's, Architect's, or Engineer's inspection.
- Record Documents
 - 1. At Contract closeout, the prime consultant is responsible for developing permanent Project Record Documents by transcribing information contained in the Field Record Documents onto original (electronic) media.
 - 2. As-Constructed Specifications:
 - a. A single MS Word Document
 - (1) Plus one Adobe .pdf file
 - b. Updated with the following annotations for each component or specification section as appropriate:
 - (1) Per General Conditions, cross reference each specification section to a master list of subcontractor, suppliers, and installers, complete with addresses and telephone numbers.
 - (2) Clearly differentiate between actual installed items and bid options or substitutions.
 - (3) Indicate changes made by Addendum, Change Order, Alternate, and Field Order.
 - (4) Identify manufacturer, trade name, catalog number and supplier of each product and item or equipment actually installed.
 - (5) Document the installed color, texture, and pattern.
 - 3. As-Constructed Product/Finish/Equipment Schedules:
 - a. Text, Spreadsheet or Database file plus one reproducible plot updated with the following annotations:
 - (1) Manufacturer, trade name, catalog number and supplier of each product and item or equipment actually installed.
 - (2) Color, texture, pattern.
 - (3) Changes made by Addendum, Change Order, Alternate, and Field Order.
 - 4. As-Constructed Record Drawings:
 - a. Native AutoCAD Files, As plotted PDF files, two full-sized paper plots, one 11" x 17" hardcopy paper plot , updated with the following annotations and corrections:
 - (1) Addenda
 - (2) Bid Alternates accepted/not accepted

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- (3) Change Orders, Field Orders, Supplemental Instructions
- (4) Differing/Uncovered conditions
- (5) Size/position/dimensional differences exceeding 4 inches
- (6) Locations of concealed or buried utilities and systems
- (7) Other information necessary to support facility operation for the full life-cycle
- 5. Supplemental Documents
 - a. Per CSI Uniform Drawing System
 - b. Required As-Constructed Annotations
 - c. Cross reference both original document and supplement to each other
 - d. Identify supplemental documents in Index / Table of Contents
- 6. Approved Shop Drawings:
 - a. AutoCAD file
 - (1) Plus “As Plotted”.pdf file
 - (2) Plus, two full-sized plot on paper
 - (a) Updated per As-Constructed Record Construction Drawings are required for:
 - (b) 21 00 00 Fire Suppression;
 - (i) Including one (1) hardcopy set approved (stamped) by the ‘Authority Having Jurisdiction’ (AHJ)
 - (c) 25 30 00 Integrated Automation Instrumentation (Temperature Controls)
 - (d) 27 53 13 Clock System
 - (e) 28 10 00 Access Control
 - (f) 28 20 00 Electronic Surveillance
 - (g) 28 30 00 Electronic Detection and Alarm Systems
 - (i) Including one (1) hardcopy set approved (stamped) by the ‘Authority Having Jurisdiction’ (AHJ)
 - (h) 32 80 00 Irrigation System
 - b. One hardcopy reproduction of original approved shop drawings is required for all other specification sections.
- 7. Submittal log, complete with review comments, corrections, and authorizations
- 8. Project Files
 - a. One complete set of project administration records identified in Section 01 31 00.
 - b. Correspondence including hard copies of significant e-mail communications.
- 9. Label closeout submittals to clearly identify:
 - a. Submittal, including specification section number.
 - b. Project – specific title
 - c. Architect or Prime Consultant
 - d. Owner: Jefferson County School District, R-1
 - e. Date
 - f. “As Constructed” when applicable
- 10. “As Constructed” Closeout submittals are not required for:
 - a. Demolition
 - b. Temporary Construction
 - c. Reference Documents provided by Owner.
- 11. Submit per Section 01 77 00.
- 12. See Consultant Guidelines 005 for format requirements.

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END SECTION 01 78 39

01 78 43 Spare Parts - August 2015

- Contract documents must clearly identify
 1. Specific items
 2. Quantities
 3. Time of transmittal
 4. Transmittal process
- Process:
 1. Contractor submits directly to Jefferson County School District, R-1 District Project Manager.
- Spare parts may not be used for post-construction warranty work.
- Submit per Section 01 77 00.

END SECTION 01 78 43

01 78 46 Extra Stock Materials - October 2010

- Contract documents must clearly identify
 1. Specific items
 2. Quantities
 3. Time of transmittal
 4. Transmittal process
- Provide products, spare parts and maintenance materials in quantities specified in each section of these Technical Guidelines.
- For items of work delayed materially beyond the Date of Final Acceptance provide updated submittal(s) within ten (10) days after acceptance, listing actual date(s) of the start of the warranty period.
- Process:
 1. Contractor submits directly to Jefferson County School District, R-1 Project Manager.
 - a. Submit draft list within 60 days of contract execution
 - b. Submit all extra stock material items to District Project Manager with a single transmittal per Section 01 77 00.
- Extra stock materials may not be used for post-construction warranty work.

END SECTION 01 78 46

01 78 53 Sustainable Design Documentation - October 2010

- No Requirements

END SECTION 01 78 53

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01 79 00 Demonstration and Training – August 2015

- Jefferson County School District, R-1 routinely requires Demonstration and Training (D&T) for systems in several Divisions.
- Coordination
 1. Specific requirements for D&T will be found in the individual specification sections of Divisions 14 - 28 of these Technical Guidelines.
 2. 01 91 00 Commissioning
 3. 01 92 00 Facility Operation
 4. 01 93 00 Facility Maintenance
- Jefferson County Schools reserves the right to terminate and reschedule any D&T session that is not in full compliance with the following requirements.
- Sequence
 1. Submit outline draft of proposed D&T program within 60 days of the Notice to Proceed.
 - a. Submitted by each subcontractor and vendor responsible for demonstration and training
 - (1) Written training plan submitted to Jefferson County School District Project Manager or Commissioning Agent for approval
 - (2) Plan will cover:
 - (a) Equipment list
 - (b) Agenda, including topics to be covered, such as
 1. Design intent
 2. Equipment inspections
 3. Modes of operation
 4. System interactions
 5. Troubleshooting
 6. Preventive maintenance
 - (c) Expected duration of demonstration and training session (see schedule below)
 - (d) Methods
 1. Classroom lecture
 2. Video
 3. Site walk-through
 4. Actual operational demonstrations
 5. Written Handouts
 6. Other
 - (e) Instructor and qualifications
 1. Controls contractor provides a discussion of the control of the primary HVAC equipment during the mechanical or electrical training conducted by others
 - b. Approved operations and maintenance manuals shall be used during the demonstration and training for equipment specific references
 2. Systems must be fully operational before D&T session can be scheduled.

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3. Complete final punch list items no later than 14 calendar days prior to the proposed D&T.
 4. Notify Architect a minimum of 7 calendar days in advance of proposed D&T and include a written agenda for the session.
 5. The D&T is considered scheduled once the Prime Consultant has approved the above.
 6. Conduct D&T session.
 7. Upon completion of the D&T, the District Project Manager will determine if it was successful and signoff completion of this requirement.
 8. Submittals
- Schedule for Demonstration and Training session
 1. Tuesday, Wednesday, or Thursday, except when immediately before or immediately after a holiday.
 2. Commence session at 8:00 a.m. and complete by 2:00 p.m.
 3. If additional time is required, schedule additional sessions.
 4. If the D&T will run past 11:30 a.m., a 45 minute lunch break will be provided.
 - Attendees
 1. Only qualified personnel are to conduct the D&T.
 2. If the District Project Manager determines at any time the person conducting the D&T does not adequately represent the intent of the D&T, that session will be terminated and rescheduled.
 3. Company and person conducting the demonstration and training
 4. Contractor is responsible for advising appropriate contracting personnel.
 5. Jefferson County School District, R-1 Facilities Maintenance Equipment Group (Chiller, Exhaust Fans, Main Switchgear, Elevator, ...)
 6. District Project Manager will be responsible for advising the appropriate District personnel.
 - Resources required to conduct the D&T session
 1. Written agenda
 2. To the greatest extent possible, the completed and approved Operation and Maintenance Manual shall serve as the 'textbook' for instruction.
 3. Keys, ladders, cellular phones, radios, access cards, access codes, contact numbers, lifts, ladders and any associated equipment necessary to access, demonstrate and conduct training on the equipment and systems covered in the D&T session.
 4. Attendance roster of participants including:
 - a. D&T systems to be covered that day
 - b. Date and time of D&T
 - c. First and last name
 - d. Organization
 - e. Phone number
 - f. Email address
 5. Provide and maintain a separate sheet to list questions requiring responses after the D&T
 - Responsibilities
 1. General Contractor is responsible for training coordination, scheduling and ensuring completion of training

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2. Jefferson County School District Commissioning Agent is responsible for reviewing and approving the content of the training of Owner personnel for commissioned equipment
- Follow up submittals
 1. Any outstanding questions will be answered in writing within 7 calendar days of the T&D. This response will be sent to the Architect
 2. Include D&T attendance list(s) in the O&M manual.
- District Project Manager or designee will be the ruling authority for issues requiring District response.

END SECTION 01 79 00

01 81 00 Facility Performance Requirements - October 2010

- Accessibility
 1. Comply with Americans with Disabilities Act (ADA), ADA Architectural Guidelines (ADAAG) and ICC/ANSI 117.1 for new construction including building additions, temporary buildings, sites, and playgrounds.
- Remodeling and retrofit construction, including site work, is to provide improved accessibility where feasible and as defined by the ADA and applicable codes.
- Acoustic Performance - General
 1. Proper room acoustics are essential to providing an environment conducive to student learning and a comfortable working environment for Teachers and Staff.
 2. Refer to ANSI/ASA Standard S12.60 "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools;" Current edition.
- Appearance
 1. Jefferson County School District, R-1 buildings and grounds are the visible image of the School District to a large segment of the community.
 2. As such, they should physically represent the underlying philosophies of the School District and be consistent with the current mission and belief statements adopted by the Board of Education.
 3. Designs for additions and modifications to existing facilities are to respect, enhance, complement and unify existing construction.
- Durability / Maintainability
 1. The design and construction decisions that are made must recognize the fact that Jefferson County School District R-1 anticipates operating and maintaining viable facilities for at least 40 years.
 2. Building components should be easily maintained yet durable. Recognize the District's limited resources when selecting products and systems that may require a significant maintenance commitment.
 3. Buildings and component parts should be resistant to vandalism and abuse typical of public / institutional facilities.
 - a. "Commercial" construction design and materials are generally unacceptable for educational occupancies.

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4. Layouts, designs, materials, and details must recognize and accommodate Colorado weather extremes including hail, snow, winds over 120 mph, ambient temperatures from -30°F to +105°F, hundreds of freeze-thaw cycles per year, and thermal shock of 60°F within a period of hours.
 5. Positive drainage is paramount, from the highest roof level to the lowest elevation of the site.
 6. Building layouts, materials and components are to be maintainable (serviceable, repairable, in-kind replaceable) for the life of the facility.
 - a. Provide adequate access to service and replace components (i.e. lamps, glazing, valves, boilers, and air handling units).
 7. Design to discourage bird nests in exterior fenestration and exposed structure.
- Economy
 1. These Technical Guidelines are intended to result in Jefferson County School District R-1 designs, materials, equipment, and facilities that will provide the best long-term value. Completed facilities are to be efficient and economical but not "cheap", aesthetically mediocre or "trendy".
 - Energy Efficiency
 1. The energy usage of District Facilities is one of the most significant and unpredictable costs. The consultant is encouraged to use systems that will conserve energy while providing an atmosphere conducive to learning. Minimal compliance with energy codes is mandatory, going beyond minimum is encouraged when the cost of the upgrade will be recovered in a timely manner through energy savings.
 2. Energy use goal is 35,000 BTU/sf/year for new construction
 3. EPA Energy Star Target Finder Software Score = 75 or better
 4. Coordinate energy efficiency options with the Xcel Energy Rebate Program (303-294-2359).
 - Flexibility
 1. Demographic trends and educational programs are not constant.
 - a. Design and construction of Jefferson County School District R-1 buildings must take these realities into account and be able to accommodate inevitable changes.
 2. Employ the principles of universal design to the greatest extent possible.
 3. The facility must allow for modification at minimal cost and within short time frames.
 4. Facilities are intended to serve multiple functions such as community centers, meeting places and other after-hours group activities.
 5. Additions and remodels during the life of the facility are likely.
 - Portable or re-locatable components preferred over built-in.
 1. With limited resources and an average facility life in excess of 50 years, individually customized facilities, spaces, and amenities are prohibited.
 - HVAC Criteria
 1. The "Educational Specifications" contain criteria for HVAC (Mechanical) systems and shall be considered a part of these Guidelines.
 2. Install all HVAC control devices in "Readily Accessible" locations as defined by Chapter 1, Article 100, of the most recent issue of the National Electrical Code.

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- a. Include access doors or hatches in hard ceiling or walls where needed to reach mechanical devices such as valves, strainers dampers, etc. or where in the judgment of the designer maintenance access will be necessary.
3. When reusing or connecting to existing piping, clarify to what extent the contractor is to clean and test the existing system.
 - a. Connections to existing pipe shall be made with new isolation valves.
4. Evaluate discharge plenums vs. horizontal discharge ductwork on Roof Mounted Air Handling Units for the effect on cost, noise and unit efficiency.
5. Equipment Room Recommendations:
 - a. Comply with ASHRAE Standards 15-2004 with special emphasis on:
 - (1) Oxygen Deprivation Sensor for A1 Refrigerants or a Refrigerant Sensor for B1 and all other refrigerants
 - (2) Equipment Room Alarm
 - (3) Mechanical Ventilation
6. Comply with ASHRAE 62-2001 *Ventilation for Acceptable Indoor Air Quality* Paragraph 6.1.3.1 Multiple Spaces
7. Schools at elevations below 7,000 feet shall be air-conditioned.
 - a. Schools above 7,000 feet elevation shall not be air-conditioned.
 - b. MDF and designated IDF are air conditioned regardless of location.
8. Design for major remodels of existing buildings that do not have air-conditioning shall include the addition of air-conditioning.
9. Heating and Cooling Calculations – When sizing heat transfer media quantities, heat transfer equipment, pumps, boilers and chillers base calculations on the use of a 30% propylene glycol solution heat transfer media.
10. Roof mounted equipment and piping:
 - a. Refer to Division 07 of these guidelines.
11. HVAC Design Conditions
 - a. See Division 23 of these Technical Guidelines.
- Safety/Security
 1. Coordination
 - a. See Division 28 of these Technical Guidelines
 2. General
 - a. Electronic Safety and Security systems are standard components of Jefferson County School District R-1 facilities.
 - (1) Access Control
 - (2) Intrusion Detection
 - (3) Video Surveillance: Video surveillance systems are required for all new construction and major renovation at facilities housing grades 7 – 12.
 - (4) Fire detection and Alarm
 3. Attractive Nuisances and Hazards
 - a. Avoid projections, details, site amenities, rustication, etc. which could permit unauthorized access to roofs or upper building levels.
 - b. Open, unsecured areaways are prohibited.
 - c. Details and materials must not adversely affect the safety of occupants, students, staff and community.
 - d. Non-slip walking surfaces are required.

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- e. Projections and sharp corners are prohibited at student/pedestrian traffic patterns, interior and exterior.
- 4. Site
 - a. Layout and design to minimize ice buildup at pedestrian and vehicle areas.
 - b. Address snow removal and stockpiling
 - c. Separate pedestrian, bicycle, auto, bus and service traffic
- 5. Stairs and Steps
 - a. Tread/riser ratios: Per Architectural Graphic Standards, and applicable codes.
 - b. Exterior stairs:
 - (1) Maximum riser = 6"
 - (2) Minimum tread = 13.5"
- 6. Ramps: Per ADAAG
- Sustainable Design
 - 1. When required to meet funding or other requirements comply with LEED or Collaborative for High Performance Schools (CHPS) criteria.
 - 2. Optimize material use and recycling to minimize waste during construction.
 - 3. Design, install and maintain low water use, low maintenance landscaping appropriate to the local environment. Investigate and utilize water district programs offering low usage water fixtures
 - 4. Consider life cycle impacts of materials, from production to end-of-life recycling
 - 5. Encourage the use of locally produced materials where possible

END SECTION 01 81 00

01 90 00 Life Cycle Activities - October 2018

- Preliminary Life Cycle Cost Analysis (LCCA) shall be performed during SD Phase with direction provided by Jeffco during SD Review.
- A Life Cycle Cost Analysis shall be performed for a period of 30 years of ownership for at least three design alternates comparing ownership costs such as First Costs, Maintenance Costs, Utility Costs, and Part Replacement Costs if applicable.
- Life Cycle Cost Analysis activities shall be performed in accordance with the Office of the State Architect Energy Management Program Policies and Procedures Life Cycle Cost Policy.
- LCCA shall only consider systems meeting current IGCC Code.
- Life Cycle Cost Analysis activities shall be provided by the architect and include, but not be limited to:
 - 1. First Costs
 - 2. Maintenance Costs
 - 3. Utility Costs
 - 4. Part Replacement Costs if applicable
- The LCCA shall be reviewed by the Director of Planning, Director of Construction Management, Coordinating Engineer, Energy Manager, and District Project Manager. This group will provide direction or a list of clarifying questions to Architect and/or

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Engineer, through the District Project Manager, which must be satisfied before the commencement of DD Phase.

END SECTION 01 90 00

01 91 00 Commissioning – August 2026

- Comply with the following Commissioning Guidelines:

Commissioning Guidelines
For
Jefferson County Public Schools

Introduction

This commissioning specification provides a framework and specific language for commissioning new and existing facilities. The section format follows the Master Format Level 1 and 2 titles (Copyright 1995, The Construction Specifications Institute). The commissioning specification language can be used directly to describe the commissioning process for new construction and retro commissioning for existing buildings. Some sections will require the CA to customize the language to fit the owner's commissioning requirements. Commissioning shall be completed prior to final acceptance by the owner. JEFFCO Commissioning Engineer shall refer to an employee of the School District. Commissioning Agent (CA) shall refer to an independent consultant hired by Jeffco Schools.

Commissioning shall:

- 1) Verify that applicable equipment and systems are installed according to the contract documents, manufacturer's recommendations, and industry accepted standards and that they receive adequate operational checkout.
- 2) Verify and document proper performance of equipment and systems.
- 3) Verify that O&M documentation is complete.
- 4) Verify that adequate training has been provided to the owner's operating personnel.

General Requirements

01 30 00 Administrative Requirements

- Coordinate Administrative Requirements during the entire project development process with Jefferson County School District, R-1:
 - a. General Conditions of the Contract

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- b. JEFFCO Project Manager
- c. District Consultant Guidelines
- Submit one copy in electronic format of each administrative document to the Jefferson County School District R-1, Construction Management Project Manager.

01 31 00 Project Management and Coordination

- Commissioning
 - A. The project will have selected systems commissioned. The equipment and systems to be commissioned are specified in Section 01 91 00. The commissioning process is described in Section 01 91 00.
- Progress Meetings
 - A. Progress meetings during equipment start-up and functional performance testing shall include commissioning coordination in addition to the standard meeting format.
- Pre-Installation Conferences
 - A. Commissioning scope shall be determined by the JEFFCO Commissioning Engineer and provided to the Architect and/or Engineer prior to the Work being submitted for pricing. Should the District elect to incorporate commissioning into the project after the Work has been priced, the District will schedule a scoping meeting that includes the JEFFCO Commissioning Engineer, JEFFCO Project Manager, Architect, Mechanical Engineer, General Contractor, Mechanical Contractor and Commissioning Agent. The parties will meet and agree on the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.

01 33 00 Submittal Procedures

- Submittal Requirements for Commissioning
 - A. The Mechanical Contractor will receive a copy of the standard forms for equipment to be commissioned.
 - B. Commissioning Agent may require additional documentation necessary for the commissioning process. The Contractor may receive a written request from the Commissioning Agent for specific equipment or system information.

01 75 00 Starting and Adjusting

- Commissioning
 - A. Equipment start-up requires coordination with the commissioning process described in Section 01 91 00. The start-up procedures shall document all manufacturers' recommendations for installation, inspection, and start-up. Equipment is not "temporarily" started (for heating or cooling), until all manufacturers' installation and start-up procedures are completed, and moisture, dust and other environmental or building integrity issues have been addressed.

01 77 00 Closeout Procedures

- Summary
 - A. Refer to Consultant Guidelines.

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- B. Administrative and procedural requirements for project closeout include approved commissioning documentation as described in the following paragraphs.
- Final Acceptance
 - A. Prior to notifying the owner/architect that the project is complete according to the construction and contract documents, the Contractor shall submit to the Owner/Architect:
 - B. Approved pre-functional checklists and functional performance testing reports from the commissioning documentation.
 - C. Prior to requesting inspection for verification of completion of all outstanding items, the Contractor shall submit to the Owner/Architect:
 - 1. The commissioning requirements of Section 01 91 00 must be completed prior to final acceptance, unless approved in writing by owner. Exceptions to this are any required seasonal or approved deferred testing.
 - D. Jefferson County School District, R-1 expects to operate and maintain its facilities for a minimum of 50 years beyond the date of Final Acceptance.
 - E. To be efficient, economical, and effective in this mission, it is imperative that the School District receive accurate and permanent "as constructed" records, in both electronic and reproducible formats, of every graphic and text document used directly or indirectly to execute the commissioning process.
 - F. Requirements include receipt of approved commissioning documentation,
- The MANDATORY sequence of events for acceptance and closeout of Jefferson County School District, R-1 Commissioning is as follows:
 - 1. Final Functional Tests are submitted and processed.
 - 2. Commissioning Agent Inspection:
 - a. The CA personally inspects the work to certify completion of all contract requirements and identify deficiencies by discipline (i.e. HVAC, Plumbing, Electrical, etc.).
 - b. CA submits to the Owner:
 - (a) Approved functional performance testing reports from the commissioning documentation.
 - 3. Written Notification of Project Completion:
 - a. The Contractor certifies inspection, acceptance, and suitability of the work for the Design Consultant's Final Inspection and attaches the CA Commissioning Log.
 - 4. Commissioning Log/Punch List Inspection:
 - a. Upon receipt of the Written Notification of Project Completion, the CA/Design Consultant schedules a Punch List Inspection with the Contractor and JEFFCO Project Manager to initiate Commissioning Acceptance.
 - b. Partial Punch Lists by area of construction may be permitted with the approval of the JEFFCO Project Manager.
 - 5. Punch List:
 - a. The CA prepares and distributes a written Report of Inspection summarizing the Punch List Inspection to the Design Consultant/Owner.

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- b. Upon completion of items identified in the Commissioning Log, the CA advises the Design Consultant in writing that the project is complete, inspected, and ready for the Final (Acceptance) Inspection.
 - (a) Include submittal of the all requirements from 01 91 00 Commissioning.
 - (2) Exceptions to this are any required seasonal or pre-approved deferred testing.
- 6. Final (Acceptance) Inspection
 - a. Upon receipt of the Notice of Completion, the Architect schedules a Final Acceptance Inspection with the CA, Contractor and the JEFFCO Project Manager.
- 7. Project Closeout:
 - a. The Contractor executes the Project Closeout requirements of the General Conditions and the Contract Documents.

01 78 00 Closeout Submittals

- Summary
 - A. Submit operations and maintenance manuals to JEFFCO Commissioning Engineer for review.
- Operation and Maintenance Manuals
 - A. Commissioning Review: Prior to completion, JEFFCO Commissioning Engineer reviews the O&M manuals for systems that were commissioned. The manuals are reviewed for completeness and for adherence to the requirements of the Contract Documents. JEFFCO Commissioning Engineer will communicate deficiencies in the manuals to the CA/JEFFCO PM. This work does not supersede the A/E team's responsibility to review the O&M manuals.
- Commissioning Record in O&M Manuals
 - A. The Commissioning Engineer is responsible to compile, organize and index all commissioning data into labeled and indexed three-ring binders for delivery to the PM. The manual summarizes all of the tasks, findings, and documentation of the commissioning process. The report addresses the actual performance of the building systems in reference to the design intent and contract documents.

01 79 00 Demonstration and Training

- SUMMARY
 - A. Includes General requirements and procedures for demonstration of the products and systems of the facility, and training of the owners operating and maintenance personnel.
- TRAINING OF OWNER PERSONNEL
 - A. The CA/GC shall be responsible for training coordination and scheduling and for ensuring that training is completed.
 - B. The CA shall be responsible for reviewing and approving the content of the training of Owner personnel for commissioned equipment.
 - C. The specific training requirements of Owner personnel by Subs and vendors are specified in the Division in which the equipment is specified.

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- D. Each Sub and vendor responsible for training submits a written training plan to the PM for review and approval prior to training. The approved O&M manuals shall be used during the training for equipment specific references. The plan will cover the following elements:
1. Equipment list
 2. Agenda and subjects (design intent, equipment inspections, modes of operation, system interactions, troubleshooting, preventative maintenance, etc.)
 3. Expected duration of training session
 4. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 5. Instructor and qualifications
- E. For primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.

01 91 00 Commissioning

- Jefferson County School District, R-1 routinely performs or contracts Commissioning of systems in Facility Services Subgroup (Divisions 21-28) and reserves the right to perform or contract similar quality control measures at any time on systems in any other Division.
- The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product whether it is specifically stated or not.
- Commissioning during the construction, acceptance and warranty phases of a project is intended to achieve the following objectives:
 1. Verify and document that equipment is installed and started per manufacturer's recommendations and to accepted industry standards.
 2. Verify and document that equipment and systems receive complete operational checkout by installing contractors.
 3. Verify the completeness of Operations and Maintenance information and materials.
 4. Ensure that the Owner operating personnel are adequately trained on the operations and maintenance of building equipment and systems.
- Coordination
 - A. 01 33 00 Submittal Procedures
 - B. 01 75 00 Starting and Adjusting
 - C. 01 77 00 Closeout Procedures
 - D. Refer to Sections 01 78 13 – 01 79 00
 - E. 01 91 00 Commissioning
 - F. 01 93 00 Operation and Maintenance
 - G. 22 08 00 Commissioning of Plumbing
 - H. 23 08 00 Commissioning of HVAC
 - I. 26 08 00 Commissioning of Electrical Systems
 - J. 27 08 00 Commissioning of Communications

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- **Definition**
 - A. Commissioning is a comprehensive and systematic process to verify that the building systems will perform as designed and meet the owner's requirements. Commissioning during the construction, acceptance, and warranty phases is intended to achieve the following specific objectives:
 1. Verify and document that equipment is installed and started in accordance with manufacturer's recommendations and industry standards.
 2. Verify and document that equipment and systems receive complete operational checkout by installing contractors.
 3. Verify and document equipment and system performance.
 4. Verify the completeness of operations and maintenance materials.
 5. Ensure that the owner's operating personnel receive adequate training on the operation and maintenance of building equipment.
 - B. Scheduling. The CA will work with the JEFFCO PM to schedule commissioning activities.
- **Commissioning Process**
 - A. The following activities describe the commissioning tasks during construction and the general order in which they occur.
 1. Scoping Meeting. All members of the design and construction team that will be involved in the commissioning process meet and review the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.
 2. Commissioning Plan. The commissioning plan provides guidance in the execution of the commissioning process. The Specifications take precedence over the Commissioning Plan.
 3. Submittals. Equipment documentation is submitted to the CA during normal submittals, including detailed start-up procedures.
 4. Start-Up/Pre-Functional Checklists. The CA works with the responsible contractors to develop startup plans and documentation formats, including providing the pre-functional checklists to be completed during the startup process.
 5. Functional Performance Testing. The CA develops specific equipment and system functional performance test procedures.
 6. The responsible contractors review the procedures. The procedures are executed under the direction of the mechanical contractor (MC), and documented by the MC for submittal to Mechanical Engineer (ME) and forwarded to the Design Architect/Engineer, JEFFCO PM and CA.
 7. Deficiencies and Resolution. The CA/ME shall record items of non-compliance in materials, installation or operation. Items requiring corrections are the responsibility of the MC. Upon completion of the corrections the equipment or systems shall be retested at no cost to JEFFCO.
 8. Operations and Maintenance Documentation. The CA reviews the O&M documentation for completeness.
 9. Training. The CA reviews and coordinates the training provided by the responsible contractors and verifies completion.
 10. Seasonal Testing. Deferred or seasonal testing is conducted, as required.

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- Related Sections
 - A. Specific commissioning requirements are given in the following sections of these specifications.
 1. Section 01 31 00 – Project Management and Coordination
 2. Section 01 33 00 – Submittal Procedures
 3. Section 01 75 00 – Starting and Adjusting
 4. Section 01 77 00 – Closeout Procedures
 5. Section 01 78 00 – Closeout Submittals
 6. Section 01 78 23 – Operation and Maintenance
 7. Section 01 79 00 – Demonstration and Training
 8. Section 01 91 00 – Commissioning
- Responsibilities
 - A. Commissioning Agent Responsibilities
 1. Work with Jeffco Project Manager and develop Commissioning Plan.
 2. Participate in and attend commissioning scoping meetings.
 3. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures, and sequences of operation.
 4. Review Contractor submittals applicable to commissioned systems, concurrent with the A/E reviews.
 5. Review start-up and checkout plans with CA, MC and Subs for pre-functional checklists.
 6. Perform site visits, as necessary, to observe component and system installations. Attend construction job-site meetings, as necessary, to monitor construction and commissioning progress.
 7. Review completed pre-functional checklist and start-up reports.
 8. Assist with coordination of start-up requirements with TAB requirements.
 9. Review functional performance test procedures for equipment and systems.
 10. Witness and document functional performance tests completed by installing contractors. Coordinate retesting as necessary until satisfactory performance is verified. A cost of \$300.00 will be back charged for every re-test required.
 11. Review the training proposed by the contractors for the Owner's operating personnel.
 12. Review the O&M manuals.
 13. Warranty Period
 - a. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
 - b. Review as-built documentation.
 - B. Design Team (A/E): Construction and Acceptance Phase
 1. Attend commissioning meetings as necessary.
 - b. Provide design intent and sequence of operation documentation as required by the CA.
 - c. Assist in resolution of system deficiencies identified during commissioning.
 4. Maintain a master deficiency and resolution record. Provide the CA with written progress reports and test results with recommended actions.
 5. Review and approve the operations and maintenance manuals.

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6. Prepare a final commissioning report.
 7. Review functional performance test plans. Witness performance testing.
 8. Warranty Period
 - a. Resolve system deficiencies identified during warranty period commissioning.
- C. JEFFCO Project Manager (PM): Construction and Acceptance Phase
1. Attend commissioning scoping meeting and additional meetings, as necessary.
 2. Arrange for facility operating and maintenance personnel to participate in commissioning activities and training sessions.
 3. Provide final approval for the completion of the commissioning work.
 4. Warranty Period
 - a. Ensure that any seasonal or deferred testing and any deficiency issues are addressed.
- D. General Contractor (GC): Construction and Acceptance Phase
1. Coordinates and directs all commissioning activities. Work with the CA and PM to ensure that commissioning activities are scheduled.
 2. Facilitate the coordination of the commissioning work by the CA.
 3. Attend commissioning scoping meeting and additional meetings, as necessary.
 4. Furnish copies of construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the ME.
 5. Ensure that MC and Subs execute their commissioning responsibilities according to the Specifications and Commissioning Plan.
 6. Coordinate the training of owner personnel.
 7. Prepare O&M manuals, according to the Specifications, including updating original sequences of operation to as-built conditions.
 8. Warranty Period
 - a. Ensure that MC and Subs execute required seasonal or deferred functional performance testing.
 - b. Ensure that MC and Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for issues identified during the warranty period.
- E. Mechanical, Electrical, Building Automation Controls, Controls and TAB Contractors: Construction and Acceptance Phases
1. Attend commissioning scoping meeting and additional meetings, as necessary.
 2. Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures.
 3. Assist in clarification of operation and control of commissioned equipment where the specifications, control drawings or equipment documentation is not sufficient.
 4. Develop a start-up and checkout plan for all commissioned equipment based on manufacturer's recommendations and pre-functional checklists from the CA. Submit to CA for review and approval prior to startup.
 5. During the startup and checkout process, execute the mechanical-related portions of the pre-functional checklists for all commissioned equipment.

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- Perform and clearly document all completed startup and system operational checkout procedures.
6. Resolve A/E punch list items before functional testing. Air and water TAB shall be completed with discrepancies and problems resolved before functional testing.
 7. Perform functional performance testing, under the direction of the CA, for commissioned equipment.
 8. Resolve equipment or system deficiencies and retest as required
 9. Prepare O&M manuals according to the Specifications, including updating original sequences of operation to as-built conditions.
 10. Provide training of the Owner's operating personnel as specified.
 11. Coordinate with equipment manufacturers to determine requirements to maintain the validity of warranties.
 12. Warranty Period
 - a. Execute seasonal or deferred functional performance testing, as necessary.
 - b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for issues identified during the warranty period.
- F. Controls Contractor: The commissioning responsibilities of the controls contractor, during construction and acceptance phases in addition to those listed in above are:
1. Sequences of Operation Submittals. The temperature controls submittals shall include complete and detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications. They shall include:
 - a. A narrative description of the system, describing its purpose, components and function.
 - b. Interactions and interlocks with other systems.
 - c. Delineation of control interactions between packaged controls and the building automation system, including a listing of monitored points, controlled points, and adjustable points.
 - d. Written sequences of control for packaged controlled equipment.
 - e. Sequences of control for all modes of operation (Start-up, Warm-up, Normal occupied, Unoccupied, Emergency Shutdown, etc.).
 - f. Capacity control sequences and equipment staging.
 - g. Temperature and pressure control sequences (setbacks, resets, etc.).
 - h. Sequences for all control strategies (economizer control, optimum start/stop, optimization, demand limiting, etc.).
 - i. Effects of power or equipment failure with all standby component functions.
 - j. Sequences for alarms and emergency shutdowns.
 - k. Seasonal operational requirements.
 2. Control Drawings Submittal
 - a. The control drawings shall have a key to all abbreviations.
 - b. The control drawings shall contain graphic schematic depictions of the systems and each component.

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- c. The schematics will include the system and component layout of all equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
- d. Provide a full points list with at least the following included for each point:
 - i. Controlled system
 - ii. Point abbreviation
 - iii. Point description
 - iv. Point type (digital/analog, input/output)
 - v. Display unit
 - vi. Control point or set point (Yes / No)
 - vii. Monitoring point (Yes / No)
 - viii. Intermediate point (Yes / No)
 - ix. Calculated point (Yes / No)
- 3. An as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal.
- d. The controls contractor shall prepare a written plan indicating in a step-by-step manner, the procedures that will be followed to test, checkout and adjust the control system prior to functional performance testing.
- e. Provide a signed and dated certification to the CA and ME upon completion of the control system checkout prior to owner acceptance.

G. MC Equipment Suppliers

- 1. Provide requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in effect.
- 2. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
- 3. Assist in equipment testing with agreements with the responsible contractors.

H. Commissioning Scope

- 1. The following checked equipment will be commissioned for a project as required by CA.

System	Equipment	Check
HVAC System	Chillers	
	Pumps	
	Cooling tower (If Applicable)	
	Boilers	
	Piping systems	
	Ductwork	
	Variable frequency drives (If Applicable)	
	Air handlers	
	Packaged AC units	
	Packaged HP units (If Applicable)	
	Terminal units	
	Unit heaters	
	Heat exchangers	

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	Computer room cooling units	
	Fume hoods	
	Lab room pressures	
	Exhaust fans	
	Chemical treatment systems	
	HVAC control system	
	Fire and smoke dampers	
Electrical System	Sweep or scheduled lighting controls	
	Daylight dimming controls	
	Lighting occupancy sensors	
	Power quality	
	Security system	
	Emergency power system	
	UPS systems	
	Fire and smoke alarm systems	
	Fire protection systems	
	Communications system	
	Public address/paging systems	
	Low Voltage Distribution Cable	
	Distribution Panel Circuit Breakers	
	Ground Fault Detection	
	Automatic Transfer Switch	
Other	Service water heaters	
	Refrigeration systems	
	Kitchen Equipment	

- TEST EQUIPMENT
 - A. All standard testing equipment required to perform startup and initial checkout and functional performance testing shall be provided by the Division contractor or Commissioning Agent for the equipment being tested.
 - B. Data logging equipment or software required to test equipment will be provided by the CA/CC and shall become the property of the Owner.
 - 1. All testing equipment shall be of sufficient quality and accuracy to test or measure system performance and calibrated within the previous twelve months prior to testing as required by the specifications.
- MEETINGS

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- A. Initial Commissioning Meeting. The CA will schedule, plan and conduct an initial commissioning meeting with the members of the construction team that have components or systems to be commissioned in attendance. The CA/GC will distribute meeting minutes to all parties.
- B. Miscellaneous Meetings. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues.
- **REPORTING**
 - A. The CA will provide regular reports to the Owner and the Architect/Engineer with increasing frequency as construction and commissioning progresses.
 - B. The CA will regularly communicate with all members of the construction team, apprising them of commissioning progress and scheduling changes through memos, progress reports, etc.
 - C. The CA compiles a final Commissioning Report, which summarizes all of the tasks, findings, and documentation of the commissioning process. The report addresses the actual performance of the building systems in reference to the design intent and contract documents. The report includes completed pre-functional inspection checklists, functional performance testing records, diagnostic monitoring results, identified deficiencies, recommendations, and a summary of commissioning activities.
- **SUBMITTALS**
 - A. The GC shall provide CA submittals related to the commissioned equipment for review and conformance to the Construction Documents as it relates to the commissioning process. The review is intended primarily to aid in the development of functional performance test procedures.
 - B. The CA may submit written requests for additional information from contractors to facilitate the commissioning process.
 - C. The CA may request additional design and operations narrative from the design team and Controls Contractor.
- **START-UP, PREFUNCTIONAL INSPECTION CHECKLISTS**
 - A. The following procedures apply to all equipment to be commissioned.
 - B. General. Pre-functional Inspection Checklists are developed and completed for all major equipment and systems being commissioned. The checklist documents equipment nameplate and characteristics data and confirms the as-built status of the equipment or system. These checklists also ensure that the systems are complete and operational, so that the functional performance testing can be scheduled.
 - C. Start-up Plan. The CA assists the responsible contractors in developing detailed start-up plans for all equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures is completed.
 - 1. The CA creates the pre-functional checklists, based primarily on the manufacturer's startup and checkout procedures. Each start-up item will have a date and initial line for completion by the contractor during start-up.
 - 2. The start-up plans and documentation will be provided to the PM and A/E team for review.

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- D. Completion of Pre-functional Inspection Checklists and Startup.
1. Subs and equipment suppliers schedule startup and checkout with the GC and CA.
 2. The CA shall observe, at minimum, the start-up procedures for each piece of primary equipment. If there are multiple units, a sampling strategy may be used according to the commissioning plan.
 3. For lower-level equipment components (e.g., VAV boxes, reheat coils), the CA shall observe a sampling of the start-up procedures. The sampling procedures are identified in the commissioning plan. .
 4. The Subs and vendors execute startup and provide the CA/ME with a signed and dated copy of the completed start-up and pre-functional inspection checklists.
 5. Only individuals who have completed or witnessed the line item task shall make initials or checks on the forms.
- E. Deficiencies, Non-Conformance and Approval in Checklists and Startup.
1. The Subs shall clearly list any items of the start-up and pre-functional procedures not successfully completed at the bottom of the form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CA/ME within two days of test completion.
 2. The ME/CA reviews and verifies all pre-functional inspection checklists and start-up reports and recommends approval to the PM. The ME/CA assists the Subs and vendors to correct and retest deficiencies or uncompleted items, involving other members of the commissioning team as necessary.
- **FUNCTIONAL PERFORMANCE TESTING**
 - A. The following procedures apply to all equipment to be commissioned, according to Section 1.6, Commissioning Scope. This sub-section applies to all commissioning functional performance testing for all divisions.
 - B. Objectives and Scope. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Construction Documents. Functional performance testing comprises a full range of tests to verify that all components, equipment, systems, and interfaces between systems operate correctly. This includes all operating modes, interlocks, control sequences, and responses to emergency conditions. All verification procedures are directed, witnessed, and documented by the CA/ME.
 - C. Development of Test Procedures. The CA develops specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Prior to execution, the CA provides the test procedures to the Sub(s) who review the tests for feasibility, safety, equipment and warranty protection. The CA submits the tests to the A/E team for review.
 1. The test procedure forms developed by the CA shall include the following information:
 - a. System and equipment or component name(s).
 - b. Equipment location and ID number.
 - c. Date.
 - d. Project name.
 - e. Participating parties.
 - f. Acceptance criteria of proper performance with a Yes / No check box.
 - g. A section for comments.

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D. Execution of Functional Performance Tests

1. Test Methods. Functional performance testing and verification may be achieved by direct manipulation of system inputs (i.e. heating or cooling sensors), manipulation of system inputs with the building automation system (i.e. software override of sensor inputs), trend logs of system inputs and outputs using the building automation system, or short-term monitoring of system inputs and outputs using stand-alone data loggers. A combination of methods may be required to completely test the complete sequence of operations. The CA determines which method, or combination, is most appropriate.
2. Setup. Each test procedure is performed under conditions that simulate normal operating conditions as closely as possible. The MC and Sub executing the test provides all necessary system modifications to produce the specified conditions (flows, pressures, temperatures, etc.) necessary to execute the test. At completion of the test, the MC and Sub returns all affected building equipment and systems to their pre-test conditions.
3. Sampling. Multiple identical pieces of non-life-safety or non-critical equipment may be functionally tested using a sampling strategy. The sampling strategy is developed by the CA and approved by the PM/ME. If, after three attempts at testing the specified sample percentage, failures are still present, then all remaining units are tested at the contractors' expense.

E. Coordination and Scheduling. Responsible contractors shall provide sufficient notice to the GC regarding their completion schedule for the pre-functional checklists and startup of all equipment and systems. The GC schedules functional tests through the PM, CA and responsible contractors. The following sequential priorities are followed:

1. Equipment shall not “temporarily” be started (for heating or cooling) until pre-start checklist items and all manufacturers' pre-start procedures are completed and moisture, dust and other environmental and building integrity issues have been addressed.
2. Functional performance testing shall not begin until pre-functional, start-up and TAB is completed for a given system.
3. The controls system and equipment it controls shall not be functionally tested until all points have been calibrated and pre-functional checklists are completed.

F. Problem Solving. The CA may recommend solutions to deficiencies identified during functional testing. However, the burden of responsibility to solve, correct and retest deficiencies is with the GC, responsible contractors and the A/E team.

• **DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS**

A. Documentation: The ME/CA witnesses and documents the results of all functional performance tests using forms developed for that purpose. Prior to testing, these forms are provided to the PM/ME for review and approval.

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B. Non-Conformance:

1. The MC/CA records the results of the functional test on the procedure or test form. All deficiencies identified during the verification testing are documented on a standard form and reported to the A/E, CA, PM, GC and sub-contractors. The deficiency report includes all details of the components or systems found to be non-compliant with the parameters of the test plans. The report details the adjustments or alterations required to correct system operation, and identifies the responsible party.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the ME/CA. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. For identified deficiencies:
 - a. If there is no dispute on the deficiency and the responsibility to correct it:
 - 1) The MC documents the deficiency and the adjustments or alterations required to correct it. The Sub corrects the deficiency and notifies the MC that the equipment is ready to be retested.
 - 2) The MC reschedules the test and the test is repeated.
 - b. If there is a dispute about a deficiency or who is responsible:
 - 1) The deficiency is documented on the non-compliance form and a copy given to the ME and GC.
 - 2) Resolutions are made at the lowest management level possible. Additional parties are brought into the discussions as needed. Final interpretive authority is with the A/E team. Final acceptance authority is with the CA and PM.
 - 3) The CA/ME documents the resolution process.
 - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and notifies the ME that the equipment is ready to be retested. The test is repeated until satisfactory performance is achieved.

C. Cost of Retesting

1. The costs associated with the retesting of a pre-functional or functional test shall be charged to the GC.
2. The costs associated with the ME and CA to direct any retesting because a specific pre-functional checklist or start-up test item, reported to have been successfully completed but determined during functional testing to be faulty, will be charged to the GC.

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- a. Approval: The ME makes formal approval of the functional performance test after review. The ME recommends acceptance of each test to the CA and PM. The PM gives final approval on each test.
- DEFERRED TESTING
 - A. Unforeseen Deferred Tests. Should any test not be completed due to the time of season, required occupancy condition, or other circumstance, the functional testing may be delayed upon approval of the District PM. These tests shall be conducted in the same manner as the seasonal tests as soon as possible.
 - B. Seasonal Testing. Seasonal variation in operations or control strategies may require additional testing during the opposite season to verify performance of the HVAC system and controls. During the warranty period, seasonal testing and other deferred testing shall be completed as required to fully test all sequences of operation. The GC shall coordinate these activities. Tests shall be executed and documented, deficiencies corrected by the responsible contractor. Changes to the O&M manuals and record documents due to the testing shall be completed.
- Space temperatures shall be not less than 69.0 Deg F. in Heating Mode and less than 76.0 Deg F. in Cooling Mode per the direction from Jefferson County Public Schools Board of Education.

END SECTION 01 91 00

01 92 00 Facility Operation - October 2010

- Section 01 92 00 Facility Operation is required in the Project Manual for mechanical, electrical and other specialized equipment
- Coordination
 - 1. Section 01 78 00 Closeout Submittals
 - 2. Section 01 79 00 Demonstration and Training
 - 3. Section 01 91 00 Commissioning
- HVAC
 - 1. General Contractor provides trended information from the temperature control system at a sampling rate of 15 minutes for 168 hours (minimum) for all temperature control points.

END SECTION 01 92 00

01 93 00 Facility Maintenance - October 2010

- Section 01 93 00 Facility Maintenance is required in the Project Manual to delineate specialized requirements and procedures for operating the facility after commissioning.
- Ten Objectives of Maintenance
 - 1. Improve accessibility.

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- a. The more often a component needs to be maintained, the better should be its accessibility.
 - b. Components functioning properly should not have to be removed or dismantled in order to gain access to the defective one, which leads to “Disturbance Maintenance.”
2. Use as few components as possible.
 - a. Reduce the number of parts thereby improving the inherent system reliability.
 - b. Avoid needless differences among similar components.
 - c. Arrange components in a logical and perceivable order.
 - (1) Example: Different light fixtures and bulbs.
3. Use standardized components.
 - a. If and where possible, use readily available locally stocked components. Advantages are smaller stock holding, shorter delivery times and reducing possibilities for “cannibalizing”.
 - b. Follow Technical Specifications and Guidelines.
4. Improve parts replacement ability.
 - a. Components should be easily disconnected and adjusted without loss of reliability.
 - (1) This applies especially to components that have to be replaced frequently.
5. Neutralize human errors.
 - a. Aim to design equipment that is “easy to use right and difficult to use wrong”.
 - b. Design the equipment to be foolproof, making human errors practically impossible, particularly when carrying out maintenance tasks.
 - c. Ensure that lockout/tagout requirements are included.
6. Reduce consequential damage
 - a. Reduce the amount of damage of the initial failure by overload or continued use.
 - b. Ensure that the failure of a component does not lead to failure of another object and/or secondary failure.
7. Increase condition monitoring.
 - a. See to it that the condition of critical components can be easily ascertained, preferably when the components are in service.
 - (1) Example: installing a pressure gauge or site glass.
8. Increase “Autonomous Maintenance” and Ownership.
 - a. Changing filters, lubricating, readjustment, cleaning and other preventative maintenance can be done by the Facility Manager or semi-skilled technician, provided that minimal simple parts or tools are necessary.
 - b. Where this is difficult or too costly to incorporate in the design, then the design should make it as easy as possible for the Maintenance technician to perform these tasks quickly with a minimum of training.
9. Provide operations and maintenance documentation.
 - a. Documentation is an essential part of any project.
 - b. It is imperative that it includes a faultfinding guide.
 - (1) A word of caution is that OEM’s will tend to over maintain equipment in the hope of increasing their spare part sales.
10. Apply modular construction.
 - a. Similar systems within a site are alike.

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- b. Architectural creativity is allowed, but repair and troubleshooting are the same within a site.

END SECTION 01 93 00

01 94 00 Facility Decommissioning – August 2015

- Section 01 94 00 is required in the Project Manual when any aspect of facility decommissioning, regardless of scale, is included in the project scope.
- Coordinate Facility Decommissioning with Jefferson County School District, R-1:
 - 1. General Conditions of the Contract
 - 2. District Project Manager
 - 3. Jefferson County School District, R-1 Environmental Services Office
- Coordinate temporary and phased utilities and HVAC for partial occupancy.
- Submit Jefferson County School District, R-1 Asbestos Sign Off Sheet when scope of work includes hazardous materials abatement.
- When fluids other than water are encountered:
 - 1. Contain the fluid by appropriate means or containers.
 - 2. Contact District Project Manager.
- See 02 42 00 for Salvageable Materials.

END SECTION 01 94 00