

Denver Central Library Interior Enhancements Project

Construction Documents 01/31/2024 Volume 1 of 1





TABLE OF CONTENTS

DIVISION 01 – GENERAL REQUIREMENTS

- 01 0100 SUMMARY OF WORK
- 01 0500 LAYOUT OF WORK AND SURVEYS
- 01 0600 REGULATORY REQUIREMENTS
- 01 1100 CONSTRUCTION SAFETY
- 01 1200 PROJECT MEETINGS
- 01 1210 ALLOWANCES
- 01 2300 ALTERNATES
- 01 3000 SUBMITTALS
- 01 3100 SCHEDULE
- 01 3400 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
- 01 3591 HISTORIC TREATMENT PROCEDURES
- 01 3700 SCHEDULE OF VALUES
- 01 4000 CONTRACTOR QUALITY CONTROL
- 01 4020 QUALITY ASSURANCE
- 01 5000 TEMPORARY FACILITIES
- 01 6200 STORAGE AND PROTECTION
- 01 6300 SUBSTITUTIONS
- 01 7000 CONTRACT CLOSEOUT
- 01 7100 CLEANING
- 01 7200 CONTRACT RECORD DOCUMENTS
- 01 7300 OPERATION AND MAINTENANCE DATA
- 01 7320 CUTTING AND PATCHING
- 01 7360 SELECTIVE DEMOLITION
- 01 7400 WARRANTIES AND BONDS
- 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

DIVISION 08 - OPENINGS

- 08 1700 INTEGRATED DOOR OPENING ASSEMBLIES
- 08 4313 ALUMINUM-FRAMED STOREFRONTS
- 08 8000 GLAZING

DIVISION 09 - FINISHES

- 09 2116 GYPSUM BOARD ASSEMBLIES
- 09 5100 SUSPENDED ACOUSTICAL CEILINGS
- 09 6500 RESILIENT FLOORING AND BASE
- 09 6813 TILE CARPETING
- 09 7200 WALL COVERINGS
- 09 8436 SOUND ABSORBING WALL FINISHES
- 09 9123 INTERIOR PAINTING
- 09 9300 STAINING AND TRANSPARENT FINISHING

DIVISION 10 - SPECIALTIES

- 10 1400 SIGNAGE
- 10 1429 ENVIRONMENTAL GRAPHICS
- 10 2619 WALL PROTECTION

DIVISION 12 - FURNISHINGS

12 2400 WINDOW SHADES

END OF TABLE OF CONTENTS

SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this contract consists of furnishing all management, supervision, labor, materials, tools, equipment, services, testing and incidentals for the construction of the Work indicated in the contract documents including lump sum items and unit price items.
- B. Reference: City and County of Denver Standard Specifications for Construction General Contract Conditions 2011 Edition (the yellow book) Contract General Conditions, GC 301 Consideration, GC 306 Working Hours and Schedule, GC Title 8 Protection of Persons and Property and GC Title 14 Site Conditions
- C. Project Description:

This project is a finishes refresh of the Central Library in areas untouched by the recent Bond Project Renovation. Refer to drawings for extent of carpet replacement, resilient floor replacement, painting of walls and trim, and environmental graphics. Additionally, this project includes the replacement of one pair of Exterior Doors, the employee entrance.

- D. Project Location: 10 W. 14th Avenue Parkway, Denver Colorado
- E. Project Team Members:

Owner: City and County of Denver

Project Manager : Leanna De LaTorre

Designer: studiotrope Design Collective

1.02 SITE CONDITIONS

A. The Contractor acknowledges that he has reviewed sections 1401 and 1402 of Title 14 of City and County of Denver Standard Specifications for Construction General Contract Conditions 2011 Edition (the yellow book). The Contractor warrants that as a result of examination and investigation of all the aforesaid data and the site, that the Contractor can perform the Work in a good and workmanlike manner and to the satisfaction of the City. The City assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this contract unless such representation is expressly stated in the contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S DUTIES

- A. Except as otherwise specified, furnish the following to the full extent required by the contract:
 - 1. Labor, superintendence, supervision and products.

- 2. Construction equipment, tools, machinery and materials.
- 3. Utilities required for construction and related activities.
- 4. Other facilities and services necessary to properly execute and complete the Work, including security for worksite, and storage and protection of all materials awaiting incorporation into the Work, providing a safe working environment for workers, City and County of Denver representatives, and the public in accordance with all local, state and federal requirements.
- B. Prosecute the Work as specified and in a timely manner. Submit a schedule of Work in accordance with GC 306 Working Hours and Schedule.

3.02 COORDINATION

- A. Coordinate prosecution of the Work in accordance with GC 801 Safety of Persons and GC 802 Protective Devices and Safety Precautions; GC 803 Protection of Property and Work in Progress; and GC 804 Protection of Municipal Public Service and Utility Systems with those ongoing City and County of Denver operations, public utilities, governmental bodies, private utilities and other contractors performing work on and adjacent to the worksites. Eliminate or minimize delays in the Work and conflicts with those operations, utilities, bodies and contractors. Schedule governmental, private utility and public utility work that relies upon survey points, lines and grades established by the Contractor to occur immediately after those points, lines and grades have been established. Confirm coordination measures for each individual case with the City in writing.
- B. In the coordination effort of work by others, the Contractor shall obtain and refer to equipment locations and other layouts, as available, to avoid interface problems.
- C. The City reserves the right to permit access to the site of the Work for the performance of work by other contractors and persons at such times that the City deems proper. The exercise of such reserved right shall in no way or to any extent relieve the Contractor from liability for loss and damage to the work due to or resulting from its operations or from responsibility for complete execution of the Contract. The Contractor shall cooperate with other contractors and persons in all matters requiring common effort.

3.03 CONTRACTOR USE OF WORKSITE

- A. Confine worksite operations to areas permitted by law, ordinances, permits and the contract.
- B. Per GC 801, consider the safety of the Work and that of the people and property on and adjacent to the worksite when determining amount, location, movement and use of materials and equipment on worksite.
- C. Do not load worksite with equipment and products that would interfere with the Work. Only equipment, tools or materials required for this Work may be stored at the worksite.
- D. Per GC 803, Protect products, equipment and materials stored on worksite.
- E. Relocate stored products, equipment and materials which interfere with operations of City, government bodies, public and private utilities, and other contractors.

LAYOUT OF WORK AND SURVEYS

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers the procedures and accuracy requirements for survey services for layout of work and field measurement of work quantities to be determined by surveys.
- B. Reference Contract General Conditions, GC 318and GC 319

1.02 SUBMITTAL

- A. Refer to Technical Specifications Section 01 3000 for submittal requirements.
 - 1. Copies of original pages of field notes.
 - 2. Original field notebooks when filled and at end of contract.
 - 3. As-built measurements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION LINES AND GRADES

- A. The Contractor shall make surveys and layouts as necessary to delineate the work. The Contractor shall review GC 318 and CG 319 to assure construction surveys for the proper performance of the Work. The City will provide all reference points shown on the contract documents. The Contractor shall accurately transfer the survey control information to the points of application and maintain in good order survey control points that may be required for the completion of the Work subject as to their location, sufficiency and adequacy. The Contractor shall furnish skilled labor, instrument platforms, ladders and such other temporary structures as may be necessary for making and maintaining points and lines in connection with the surveys required.
- B. The City may draw the Contractor's attention to errors or omissions in lines or grades, but the failure to point out such errors or omissions shall not give the Contractor any right or claim nor shall in any way relieve the Contractor of his obligations according to the terms of this contract.
- C. The Contractor's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards and in proper condition and adjustment at all times. Surveys shall be performed under the direct supervision of a Colorado licensed surveyor.

3.02 AS-BUILT MEASUREMENTS

A. As-built measurement for items that will be hidden or visible including all civil, mechanical, electrical, control work and all utilities that are placed in concrete, earth or behind walls shall be made. Items located within five feet beyond a building shall be referenced to building column lines and finish floor elevations. Special attention shall be paid to items requiring service, sensors, items with moving parts, access points and locations of junctions, elevation changes and directional changes.

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section identifies primary compliance with the State, City and County of Denver's regulatory requirements outlined in Special Contract conditions SC-1 Construction Specifications and SC-13 Construction Inspection by the City.
- B. Reference: City and County of Denver Standard Specifications for Construction General Contract Conditions 2011 Edition (the yellow book) Contract General Conditions, GC 205 Building Inspection and GC 317 Permits and Licenses

1.02 BUILDING AND FIRE CODES

A. All design and construction work shall be governed by the Building Code for the City and County of Denver, latest edition. This is based upon the International Building Code of the International Code Council with Denver Amendments to this code. See Special Contract Conditions, Construction Specifications.

1.03 DENVER BUILDING DEPARTMENT

- A. For review and approval of all construction documents for compliance to the International Building Code 2018 and City and County and Denver Amendments 2019 or later approved editions.
- B. City and County of Denver Community Planning and Development Building Inspection Division 201 West Colfax Avenue, Dept 205 Denver, Colorado 80202 Telephone 720-865-2720 Fax 720-865-2880

1.04 DENVER FIRE DEPARTMENT

A. For review and approval of plans for compliance with the Denver Fire Department's requirements as they apply to projects for the Department of Public Works:

Β.

Denver Fire Department 745 W. Colfax Ave. Denver, Colorado 80204Telephone: 720-913-3474, or E-mail: denfpb@denvergov.org Fax 720-865-2833

C. The Contractor is advised that the Denver Fire Department – Fire Prevention Bureau requires permitting for the following activities as they apply to the scope of work. The Contractor is responsible for obtaining the appropriate permits necessary to complete the work. All costs associated with this permitting and policy compliance shall be the responsibility of the Contractor. The policies all reference the International Fire Code (IFC).

- 1. "Hot work", which is defined as the operation of any equipment or tool that creates sparks, hot slag, or radiant or convective heat as a result of the work. This includes, but is not limited to, welding, cutting, brazing, or soldering.
- 2. Use and storage of compressed gas for both temporary storage and permanent facility installation. This includes, but is not limited to, flammable gas (excluding propane-LPG), oxidizer (including oxygen), and inert and/or simple asphyxiates.
- 3. Tank installation, which includes above-ground storage tanks (AST) and underground storage tanks (UST) for both temporary tanks and permanent facility installations.
- D. In addition to the above permits, the Denver Fire Department may require other permits that are associated with the specific work in the Contract Documents. Policies provided by the Denver Fire Department are meant to provide basic information for the most common conditions and situations. In any given occupancy, many other International Fire Code (IFC) requirements may be enforced. These should be addressed with the Denver Fire Department before construction begins and during construction with premise inspection(s). Any questions can be addressed to the Fire Prevention Bureau between 6:30 AM and 9:00 AM Monday-Friday at 720-913-8242 or -8237.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PERMITS AND CERTIFICATIONS

- A. The Contractor shall maintain records on site of all permits acquired by federal, state, and local agencies. Posting of permits shall conform to requirements of the respective agencies.
- B. At the time of Substantial Completion and Final Acceptance, the Contractor shall forward to the Project Manager a copy of the Temporary Certificate of Occupancy and the final Certificate of Occupancy.

CONSTRUCTION SAFETY

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work specified in this Section includes construction safety precautions and programs by the Contractor
- B. Reference Contract General Conditions, GC 801 Safety of Persons, GC 802 Protective Devices and Safety, GC 803 Protection of Property and Work in Progress.

1.02 RESPONSIBILITY

A. The General Conditions make it clear in section 801 that all safety precautions during the construction process are the responsibility of the Contractor. The Contractor is responsible for the health and safety of his employees, agents, subcontractors and their employees, and other persons on the worksite; for the protection and preservation of the work and all materials and equipment to be incorporated therein; and for the worksite and the area surrounding the worksite. The Contractor shall take all necessary and reasonable precautions and actions to protect all such persons and property.

1.03 SUBMITTAL

A. Refer to Technical Specifications 01 3000 for submittal requirements. A safety plan shall be submitted by the General Contract prior to commencing any work.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S SAFETY PLAN

A. Provide a Contractor's Safety Program that as a minimum meets all applicable federal, state and local government requirements.

PART 3 - EXECUTION

3.01 IMPLEMENT CONTRACTOR'S SAFETY PLAN

A. Implement the approved Contractor's Operational Safety Plan as described in this Technical Specifications

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section requires the Contractor's Project Manager, Superintendent and Quality Control representative to attend meetings scheduled by the City for the collection and dissemination of information related to the subject contract.
- B. The Contractor will prepare the minutes of each construction meeting and distribute them to each of the participants.

1.02 OTHER MEETINGS

A. The Contractor will be advised of times, dates and places of City initiated meetings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be scheduled by the City after the Contract has been signed by all parties. The purpose of this meeting is to introduce the City's representatives to their counterparts in the Contractor's organization and to establish lines of communication between these representatives and outline some contract requirements. The Contractor's Superintendent and Quality Control Representative(s) shall attend this meeting.
- B. The Project Manager will distribute a notice of this meeting, along with an agenda of the subjects to be addressed.
- C. The Project Manager will explain and discuss the responsibilities and authorities of the City, the Designer, and the Project Manager's organization.
- D. The City will provide highlights of the following information at this meeting:
 - 1. Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) or Small Business Enterprise (SBE) if such was a specifically designated requirement.
 - 2. Insurance and permit requirements.
 - 3. Procedures for processing change orders.
 - 4. Procedures for submitting shop and working drawings, product data and samples.
 - 5. Monthly pay estimate cutoff dates.
 - 6. Payment procedures.
 - 7. Request for information procedures.
 - 8. Communication procedures.
 - 9. Contractor-required Daily Report
 - 10. Scheduling and coordination requirements including utility outage notifications
 - 11. Site and building access, staging areas, and parking for contractors

- 12. Any concerns for public interface during the execution of the work
- 13. Quality control/assurance procedures.
- 14. Environmental requirements regarding finding potentially contaminated materials during the execution of the work..
- 15. As-built documents.
- 16. Project closeout requirements.
- E. The Contractor will introduce the Contractor's representatives and briefly describe each person's responsibilities. The Contractor will provide the following:
 - 1. A list of all subcontractors.
 - 2. Office, storage areas and construction area layouts, along with temporary easements.
 - 3. Safety, first aid, emergency actions and security procedures including the name of the Contractor's insurance company.
 - 4. 60 day preliminary milestone schedule.
 - 5. Sequence of work.
 - 6. Construction worksite waste stream sorting and haul plan.
 - 7. Housekeeping procedures.
 - 8. The Contractor's general erosion and sedimentation control plans, noise, hazardous material, air and water pollution control plans.
 - 9. Coordination and notification for utility work and utility outages
 - 10. Deliveries and priorities of major equipment.
 - 11. Submittal Schedule
- F. Explanations provided by the City will not amend, supersede or alter the terms or meaning of any contract document and the Contractor shall not claim reliance on such explanations as a defense to any breach or failure by the Contractor to perform as specified in the contract.

3.02 CONSTRUCTION PROGRESS MEETINGS

- A. Progress meetings will be scheduled weekly. The meetings will be held at the worksite or at a location selected by the Team. Meetings will be chaired by the Contractor.
- B. The Contractor's personnel shall attend and the Contractor will be responsible for publishing minutes of the meetings.
- C. At a minimum, the following items will be addressed at each meeting. The items addressed in the meeting do not waive notification or submittal requirements as required elsewhere in the contract.
 - 1. Safety: Contractor shall report any safety issues
 - 2. Quality Control
 - a. The Contractor's Quality Control Representative shall report on inspections by other agencies and any follow-up activity required.
 - b. The Project Manager and/or the Designer will present and discuss issues regarding quality control.
 - 3. Quality Assurance

- a. The Contractor will present and discuss issues regarding quality assurance.
- 4. Design activities: open discussion
- 5. Shop drawings/submittals/material procurement
 - a. The Contractor shall provide and review the Contractor's submittal schedule and provide any updated information and/or changes to the schedule.
 - b. The Contractor shall provide information on the status of submittals requiring resubmittal.
 - c. The Contractor shall review any accepted submittals that the Contractor plans to re-submit with changes.
 - d. Contract shall provide the status of material procurement for long-lead items All long-lead items shall be identified with a separate activity on the approved CPM project schedule.
- 6. Construction activities: Open discussion to include coordination items with other Contractors and or agencies.
- 7. Schedule
 - a. The Contractor shall provide the attendees with the Contractor's three week lookahead schedule and review the items on the schedule. The schedule shall be in bar chart format and coordinated with the approved CPM.

SECTION 012100

ALLOWANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
- C. Related Requirements:
 - 1. Divisions 02 through 33 Sections for items of Work covered by allowances.

1.03 SELECTION AND PURCHASE

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

1.04 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.05 INFORMATIONAL SUBMITTALS

- A. Submit to Project Manager the invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit to Project Manager the time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Contractor to coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.06 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.07 LUMP-SUM ALLOWANCES

- A. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to City, after installation has been completed and accepted.
 - 1. If requested by Project Manager, retain and prepare unused material for storage by City. Deliver unused material to City's storage space as directed by Project Manager.

1.08 ALLOWANCES

- A. Use the allowance only as directed by Project Manager.
- B. Contractor's overhead, profit, and related costs for products and equipment under the allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. At Project closeout, credit unused amounts remaining in the allowance to City by Change Order.

1.09 TESTING AND INSPECTING ALLOWANCES (Not applicable)

1.010 ADJUSTMENT OF ALLOWANCES

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 SCHEDULE OF ALLOWANCES

1. none

SECTION 012300

ALTERNATES

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.03 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if City decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

1.05 SCHEDULE OF ALTERNATES

- 1. Add alternate 1:
 - a. Replacement of Rubber Flooring in the four Public Elevators, provide
- 2. Add Alternate 2:
 - a. Replacement of Existing Wall Drywall on Levels 5 and 7 in the Gallery and Gallery Halls.

SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section summarizes the requirements for the submittal of documents to the City that are defined in these Specifications. It also describes the procedures for "supplemental" submittals.
- B. Reference Contract General Conditions, GC 309 and GC 405.

PART 2 - PRODUCTS

2.01 SUBMITTAL SCHEDULE

- A. The Contractor shall provide a submittal schedule within 14 days after Notice to Proceed. The Submittal Schedule shall be directly related to the CPM schedule, shall identify all the submittals, and shall include the following information for each submittal item:
 - 1. Specification section, contract article, or special condition
 - 2. Specification Subparagraph
 - 3. Item description
 - 4. Date the submittal shall be submitted
 - 5. Name of subcontractor or supplier
- B. The submittal schedule shall be updated every two weeks by the Contractor and reviewed with the Project Manager at the regular project meetings.

2.02 ELECTRONIC SUBMITTALS

- A. All submittals shall be delivered to the Project Manger and Designer in electronic format, whenever possible See Technical Specifications Section 01 3400 for additional information.
- B. Acceptable electronic formats
 - a. Adobe Acrobat 90 or newer. All files shall be fully compatible with Adobe Acrobat 9.0. File shall have no security and bookmark every applicable submittal.
- C. Formats are acceptable only with written permission of the project manager or required by individual spec sections:
 - a. Microsoft Office 2007 or newer. All files shall be fully compatible with Microsoft Office 2007.
 - b. AutoDesk AutoCAD 2007 or newer. All files shall be fully compatible with AutoDesk AutoCAD 2007.
 - 1) AutoCAD files shall be self contained with no external x-references.
 - c. Other files pre-approved by the Project Manager.
- D. Electronic file names: Each electronic document shall have a unique file name. File name convention shall be as follows unless otherwise agreed to by Project Manager: -AAA-BBBBB-CCC-RZ
 - a. AAA = sequential submittal number starting at 001.

- b. BBBBB = specification section containing submittal requirements
- c. CCC = sequential specification submittal number starting at 001.
- d. RZ = sequential revision number. RZ not required on initial submittals.
- e. Example A:005-013700-002", five submittals have been logged overall with two submittals made to specification section 013700.
- f. Example B: 009-013700-002-R3, nine submittals made overall and three revisions to submittal 013700-002.

2.03 INITIAL SUBMITTAL

- A. Each submittal document shall include a title block showing the following information:
 - 1. Date of submittal and revision dates.
 - 2. Contract title and number.
 - 3. The names of Contractor, subcontractor, supplier, manufacturer and when applicable, the seal and signature of an engineer registered in the State of Colorado, for the involved discipline.
 - 4. Identification of product by either description, model number, style number or lot number.
 - 5. Subject identification by contract drawing or specification reference.
- B. On each submitted drawing, include a blank space on each sheet, three inches by four inches, in the lower right corner, just above the title block, the Designer of Record may indicate the action taken.
- C. Make submissions sufficiently in advance so that the Designer review may be completed before any material procurement or Work represented by those submittals is scheduled to be performed.
- D. Allow a minimum cycle of 10 working days for review of each submittal by the Designer of Record.
- E. The Contractor shall at the time of submission describe variations from the contract documents in writing, separate from the submittal document. If the Project Manager approves any such variations, an appropriate contract change order shall be issued except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued. If a submission contains variations and the variation column is not marked on the transmittal form, it will not be considered for review and acceptance. Along with marking the transmittal as a variation, a description must be included which outlines all the differences including maintenance and utility services along with any cost savings from an item not containing the variation.
- F. Changes in accepted submittal documents will not be permitted unless those changes have been accepted, in writing, by the City.
- G. The form and quality of submittal documents shall comply with Technical Specifications Section 013400.

2.04 SUPPLEMENTAL SUBMITTALS

A. Supplemental submittal documents initiated by the Contractor for consideration of corrective

procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals with the appropriate primary transmittal referenced.

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

A. The Contractor shall review submittal documents, stamp and sign as reviewed and approved as complying with contract documents prior to submission to the Designer of Record.

3.02 CITY REVIEW

- A. Submittal documents will be reviewed by the Designer for conformance to requirements of the contract drawings and specifications. Review of a separate item will not constitute review of an assembly in which the item functions. The Designer or the Project Manager will withhold approval of submittals that depend on other submittals not yet submitted. Review and acceptance will not relieve the Contractor from his responsibility for accuracy of submittals, for conformity of submittal document to requirements of contract drawings and specifications, for compatibility of described product with contiguous products and the rest of the system, or for protection and completion of the contract in accordance with the contract drawings and specifications.
- B. The Designer, will review the submittal documents for general conformance with the contract documents and mark the Action Code, sign and date the transmittal.
- C. The Action Codes have the following meanings:
 - 1. **A ACCEPTED** is an approval, and means that the illustration and description appears to conform to the respective requirements of the contract documents.
 - 2. **B ACCEPTED AS NOTED** is an approval, and means that the illustration and description will conform to the respective requirements of the contract documents after changes in recognition of the reviewer's comments. Submittals so marked need not be resubmitted.
 - 3. **C REVISE AND RESUBMIT** means that the submittal is unacceptable and must be revised and resubmitted.
 - 4. **E NOT ACCEPTED** means that the submittal is not approved and that a new submittal in accordance with the contract documents shall be made.
 - 5. **F RECEIPT ACKNOWLEDGED**, means an item is received by the Designer but no review was made. This mark is for use in resubmitting items that were previously Accepted as Noted and the Contractor has incorporated the notes and wants the Project Managers' staff to have the same material that the Contractor's field staff is using.

3.03 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate each submittal document with the requirements of the Work; place particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and submittals of other trades including producing as needed drawings

showing the relationship of the work of different trades.

- B. Contractor's responsibility for errors and omissions in submittal documents and associated calculations is not relieved by the City's review, correction and acceptance of submittals.
- C. Contractor's liability to the City, in case of variations in the submittal document from the requirements of the contract documents, is not relieved by the City's review and acceptance of submittals containing variations unless the City expressly approves the deviation in writing, in which the City describes the variation.
- D. The Contractor shall maintain a file of all approved submittal documents at the worksite. The complete file of approved submittal documents shall be turned over to the City with the asbuilt documents at the end of the job.
- E. Schedule impact due to resubmittal requirements is the responsibility of the Contractor.

SCHEDULE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section specifies the preparation of a preliminary schedule, construction schedule, related narratives and monthly progress reports, all encompassing complete performance of contract requirements.
- B. The Contractor shall schedule and coordinate the work of all of its subcontractors and suppliers including their use of the worksite. The Contractor shall keep the subcontractors and suppliers informed of the project construction schedule to enable the subcontractors and suppliers to plan and perform their work properly.
- C. The Contractor shall, in accordance with the requirements of the technical specifications, submit a construction schedule that shall provide for the expeditious and practicable execution of the Work within the Contract Time
- D. The construction schedule for the performance of the Work shall be a Critical Path Method (CPM) system in bar chart format, unless an alternate system is specifically identified in the technical specifications, with reasonable detail.
- E. Float or slack is defined as the amount of time between the early start date and the late start date or the early finish date and the late finish date of any activities in the schedule. Float or slack is not time for the exclusive use or benefit of either the Contractor or the City.
- F. The Contractor shall submit a monthly progress report and schedule update.
- G. The Contractor shall complete the Work within the Contract Time and in accordance with the most recent schedule submittal that has been reviewed and approved by the Project Manager during regular project meetings.
- H. Reference Special Contract Conditions, Liquidated Damages, and Contract General Conditions, GC 306, GC 603, GC 909, GC 1103, GC 1202, GC704

1.02 PLANNING

- A. The schedule shall show total contract time, including project milestones as follow or as established elsewhere in the contract documents:
 - a. Notice to Proceed
 - b. Submittal Schedule
 - c. Procurement of long lead items
 - d. Mobilization
 - e. Phase or Scope Area start and completion dates
 - f. Punchlist
 - g. Final Acceptance

- B. The Contractor shall prepare a work plan to complete the work within the contract time and complete those portions of work relating to each milestone date and other contract requirements. The Schedule shall be submitted electronically to the Project Manager in a dynamic format which will allow review and manipulation of any part of the schedule, and in PDF format. Upon the request of the Project Manager, the schedule activities shall be resource loaded showing labor man hours by crafts, major construction equipment by type and value of the work.
- C. In addition to the construction activities the schedule shall include activities for furnishing materials and equipment and vendor shop drawing preparation. The construction schedule, a supporting narrative, and the overall progress curve shall be submitted for approval within 30 days after Notice to Proceed. Within 30 days the City will respond with approval or direction to revise and resubmit within ten days. Failure of the Contractor to have a construction schedule approved by the City will be considered cause for withholding progress payment(s).
- D. To the extent that the construction schedule or any revisions thereof contains anything not jointly agreed upon in writing, or fails to show anything jointly agreed upon in writing, it shall not be considered to have the approval of the City. Failure to include any work item required for performance of this contract shall not excuse the Contractor from completing all work within applicable completion dates, regardless of the City's approval of the schedule.
- E. Failure of the Contractor to comply with this Section will be considered cause for withholding progress payment(s) or termination for default.

1.03 SUBMITTALS

- A. Refer to Technical Specifications Section 01 3000 for submittal procedures. Submit the following as indicated:
 - a. Preliminary schedule Construction schedule data and work plan Monthly progress report
 - b. As built construction schedule.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION

3.01 PRELIMINARY SCHEDULE

A. The contractor shall prepare a preliminary schedule covering the first 90 calendar days of the contract. this preliminary schedule shall be submitted at the preconstruction meeting and shall be accompanied by a narrative description of the work plan. The preliminary schedule shall show all significant work tasks that occur in the first 90 days, including planning, mobilization, shop submittals and approvals, procurement, fabrication and construction. It shall identify work items or milestones that affect or are affected by the city, other contractor's work, utilities and other third parties, and it shall list major data submittals required by the contract.

3.02 CONSTRUCTION SCHEDULE

- A. The construction schedule shall be a computerized CPM schedule that includes:
 - a. The order, sequence and interdependence of all significant work items including construction, procurement, fabrication, testing, startup and inspection and delivery of critical or special materials and equipment, submittals and approvals of critical samples, shop drawings, procedures, or other documents that could have a schedule impact.

- b. Work items by the City, other Contractors, utilities and other third parties that may affect or be affected by Contractor's activities.
- c. Proper referencing of all work items to identify applicable subcontractors or other performing parties.
- d. The construction schedule shall be prepared to include the data for the total contract duration, and the critical path shall be identified, including critical paths for interim completion dates. Scheduled start or completion dates imposed on the schedule by the Contractor shall be consistent with contract milestone dates. Milestone events shall be the schedule dates specified in the Special Conditions and shall be prominently identified and connected to the appropriate work item, denoting its start or completion. Work items related to any interim milestones shall be coded for that milestone.

3.03 PROGRESS REPORTING

- A. The Contractor shall submit a monthly progress report at the end of each month following the Notice to Proceed. At the end of each month, the Contractor and Project Manager shall agree on the progress of the work and the Contractor shall update the construction schedule accordingly. The updated construction schedule is a prerequisite to the submittal of the Contractor's application for progress payment. The schedule shall be made in accordance with Technical Specifications Section 013100-3.02. This review does not constitute an approval of the construction schedule and shall not be used for the purposes of modifying the initially approved construction schedule.
- B. The latest completion time for any work item does not fall within the time allowed by the construction schedule, the sequence of work and/or duration shall be revised by the Contractor through concurrent operations, additional manpower, additional shifts or overtime, additional equipment or alternative construction methods until the schedule produced indicates that all significant contract completion dates, occupancy dates and milestones will be met.

3.04 SCHEDULE CHANGES

- A. The Contractor's request for construction schedule changes shall be made on the latest approved construction schedule and shall be accompanied by a narrative description and justification for the change, and shall be submitted in accordance with the General Conditions Title 1105 on changes in time. Minor revisions submitted at monthly progress review meetings are not considered as changes in this context.
- B. The construction schedule may be changed when one or more of the following occur:
 - a. When a change order significantly affects the contract completion date or sequence of work items.
 - b. When the Contractor elects to change the sequence or duration of work items affecting the critical path.
 - c. When the City directs a change that affects a milestone date(s) specified in the Special Conditions or alters the length of a critical path.

3.05 CONTRACT EXTENSIONS

A. If the Contractor is granted an extension of time for completion of any milestone or contract completion date under the provisions of the contract, the determination of the total number of extended days will be based upon the current analysis of the schedule and upon all data relevant to the extension. Such data shall be incorporated in the next monthly update of the schedule.

- B. The Contractor acknowledges and agrees that delays in work items which, according to schedule analysis do not affect any milestone dates or contract completion date shown on the CPM network at the time of the delay will not be the basis for a contract extension.
- C. AS-BUILT CONSTRUCTION SCHEDULE
- D. After all contract work items are complete, the Contractor shall submit an as built construction schedule showing actual start and finish dates for all work items and milestones.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting shop and working drawings, product data, samples and record documents required by other technical specifications sections.
 - 1. The Contractor shall submit all shop drawings, working drawings, product data and samples, as defined in Title 1 of the General Conditions, to the Designer and Project Manager, if requested, in accordance with the requirements in the technical specifications. The Designer will return one copy of the shop drawings, working drawings and product data to the Contractor with a written transmittal within the time periods noted in the technical specifications.
- B. Reference Contract General Conditions, GC 110, GC 116, GC 117, GC 303, GC 324, GC 401, GC 402, and GC 405.

1.02 SUBMITTALS

- A. Refer to Technical Specifications Section 01 3000 for submittal procedures.
- B. Submittals shall be delivered to the Designer and Project Manager in electronic format, whenever possible. All submittals must be of a consistent format (all Acrobat or all Word, etc). No combination of electronic file types will be allowed unless required by a specific specification section..
 - 1. Acceptable electronic formats
 - a. Adobe Acrobat 9.0or newer. All files shall be fully compatible with Adobe Acrobat 9.0
 - b. Formats are acceptable only with written permission of the Project Manager or required by individual spec sections:
 - 1) Microsoft Office 2007 or newer. All files shall be fully compatible with Microsoft Office 2007.
 - 2) AutoDesk AutoCAD 2007 or newer. All files shall be fully compatible with AutoDesk AutoCAD 2007.
 - a) AutoCAD files shall be self contained with no external x-references.
 - 3) Other files pre-approved by the Project Manager
 - 2. Adobe Acrobat Requirements:
 - a. Drawings shall have security set to "No Security". Commenting, printing, adding photos, form fields and document signing must be allowed.
 - b. PDF submittals shall be one continuous file. No external links are allowed.
 - c. All individual components of submittals shall be bookmarked inside the PDF file.
 - d. All original documents shall be directly converted from the original electronic format to PDF. Failure to comply with these requirements will result in a return of file to the Contractor for immediate revision.
 - 1. Electronic file names: Each electronic document shall have a unique file name. File name convention shall be as follows unless otherwise agreed to by Project Manager: -

AAA-BBBBB-CCC-RZ

- a. AAA = sequential submittal number starting at 001.
- b. BBBBB = specification section containing submittal requirements
- c. CCC = sequential specification submittal number starting at 001.
- d. RZ = sequential revision number. RZ not required on initial submittals.
- e. Example A:005-013700-002", five submittals have been logged overall with two submittals made to specification section 013700.
- f. Example B: 009-013700-002-R3, nine submittals made overall and three revisions to submittal 013700-002.
- C. Quantities
 - 1. Post electronic submittals as PDF electronic files directly to Designer's FTP, Contractors FTP site or a site specifically established for the Project.
 - a. The Contractor should send an email for each submittal posted to all parties notifying them the submittal is available for review.
 - b. The Project Manager or Designer will send an email to the Contractor when the submittal review is complete.
 - 2. Contractor can submit electronic submittals via email as PDF electronic files if approved by the Project Manager.
 - 3. Three samples of each item specified in the various specification sections, unless otherwise specified.
 - 4. Note: If manufacturer's printed information is in color, all copies of submittals must be in color.
 - a. Printed information is only allowed when electronic copies are not possible.
- D. Review
 - 1. Submittal review comments by the Designer will be in electronic form and incorporated into the electronic submittal file.
 - 2. Resubmittals of electronic documents shall modify the original electronic file with new information and include the Designer's comments with appropriate responses and additional information.

1.03 CHANGES

A. Changes in products for which shop or working drawings, product data or samples have been submitted will not be permitted unless those changes have been accepted and approved in writing by the City and County of Denver.

PART 2 - PRODUCTS

2.01 SHOP AND WORKING DRAWINGS

- A. Include the following as they apply to the subject:
 - 1. Contract title, work order and number.
 - 2. Respective contract drawing numbers.
 - 3. Applicable specification section numbers.
 - 4. Relation to adjacent structure or materials.
 - 5. Field dimensions clearly identified as such.

- 6. Applicable standards such as ASTM or Federal Specification number, and pertinent authority specifications or standards.
- 7. Identification of deviations from the contract drawings and specifications.
- 8. Drawing name, number and revision.
- 9. Contractor's stamp, initialed or signed, certifying:
 - a. Verification of field measurements.
 - b. Review of submittals for compliance with contract requirements.
 - c. Compatibility of the Work shown thereon with that of affected trades.
- 10. Blank space on each sheet per Technical Specifications Section 01300, paragraph 2.02.B.
- B. Drawings of equipment and other items that contain multiple parts shall include exploded views showing the relationship of parts and the description of the parts into the smallest units that may be purchased or serviced.

2.02 PRODUCT DATA

- A. Modify manufacturer's standard and/or schematic drawings to delete information which is not applicable to the contract. Supplement standard information with additional information applicable to this contract.
- B. Modify manufacturer's standard(s), diagrams, schedules, performance charts, illustrations, calculations and other descriptive data to delete information which is not applicable to the contract. Indicate dimensions, clearances, performance characteristics and capacities. Include with the submittal electrical, plumbing, HVAC and any other diagrams, as applicable.
- C. Modify erection, application and placing instructions to delete information that is not applicable to the contract or work order.
- D. Include the following:
 - 1. Contract title, work order and number
 - 2. Respective contract drawing numbers
 - 3. Applicable contract technical specification section numbers
 - 4. Applicable standards such as ASTM or Federal Specification number, and pertinent authority specification or standards
 - 5. Identification of deviations from the contract drawings and specifications
 - 6. Contractor's stamp, initialed or signed, certifying:
 - a. Dimensional compatibility of the product with the space in which it is intended to be used
 - b. Review of submittals for compliance with contract requirements
 - c. Compatibility of the product with other products with which it is to perform or which will be next to it.
 - d. The products electrical, plumbing, control and HVAC requirements conform to contract documents and the necessary utilities are provided for in the contract documents.
- E. Certificates of compliance shall be submitted for all products. The certificates shall:
 - 1. State that the product complies with the respective specification and contract drawing

requirements

- 2. Be accompanied by a certified copy of test results pertaining to the product
- 3. Show the submittals date, Contractor's name and address, contract title and number, product represented and its location in the contract, producer's name, product trade name and catalog number, place of product origin, test date, testing organization's name and address, quantity of the product to be furnished and related contract drawing and specification section numbers
- 4. Be signed by an officer or another authorized representative of the producer and notarized
- 5. Submit one electronic copy.
- 6. Be received by the City not later than 30 days before the acceptance is needed of the products for ordering.

2.03 SAMPLES

- A. Submit samples of sizes and quantities to clearly illustrate full color range and functional characteristics of products and materials including attachment devices.
- B. Erect field samples and mock ups at the worksite as specified in the several technical specifications sections and at locations acceptable to the Project Manager. All field samples shall be erected in a location that will be readily visible throughout the life of the contract to allow comparison of the work as it progresses to the field sample.
- C. The Contractor shall verify, through appropriate inspections and tests, that the samples submitted meet the specifications and shall provide inspection and test data with the samples. The review and comments on the sample shall not relieve the Contractor of his responsibility for completion of the contract.
- D. Show the following information:
 - 1. Contract title and number
 - 2. Respective contract drawing numbers
 - 3. Applicable technical specification section numbers
 - 4. Applicable standards such as ASTM or Federal Specification number
 - 5. Identification of deviations from the contract drawings and specifications
 - 6. Contractor's stamp, initialed or signed, certifying:
 - a. Dimensional compatibility of the product with the space in which it is intended to be used
 - b. Review of submittals for compliance with contract requirements
 - c. Compatibility of the product with other products with which it is to perform or which will be next to it
 - 7. If multiple samples are submitted and the Designer is requested to make a choice, each sample shall have a unique identification number attached to it so the returned transmittal can state the identification number of the accepted sample and the Contractor will know which one it is.

PART 3 - EXECUTION

3.01 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, catalog numbers and similar data.
- B. The Contractor shall not start work for which submittals are required until a transmittal has been received by the Contractor showing acceptance or acceptance as noted by the Designer Before making submittals ensure that products will be available in the quantities and at the times required by the contract.
- C. Submit final, corrected, electronic drawings of contract and shop and working drawings showing the Work as actually installed, placed, erected and applied. Refer to Technical Specification Section 017000, Contract Closeout.

3.02 REVIEW BY THE CITY

- A. One electronic copy of the marked-up shop and working drawing and one electronic copy of the product data will be returned to the Contractor by the Designer. Only the transmittal form, appropriately marked, and two samples will be returned on sample submittals. Contractor shall maintain one approved sample onsite for the duration of the project.
- B. Contractor's responsibility for errors and omissions in submittals for compatibility will not be reduced, waived or otherwise limited by the review and acceptance of submittals by the City's Designer of Record.

SECTION 013591

HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes general protection and treatment procedures for designated historic spaces, areas, rooms, and surfaces in entire Project and the following specific work:
 - 1. While no work proposed in this project directly impacts designated or soon to be designated Historic spaces, please note that both the Burnham Hoyt (1955) and Michael Graves (1995) portions of the building are or will be Landmarked.
 - 2. The Ruscha artwork which lines the Great Hall at Level 3 is of particular importance and is to be protected from construction activities.

1.03 DEFINITIONS

- A. Consolidate: To strengthen loose or deteriorated materials in place.
- B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.
- C. Existing to Remain: Existing items that are not to be removed or dismantled.
- D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful restoration as determined by Designer. Designated historic surfaces are indicated on Drawings.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Designer.
- F. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.
- G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- I. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated

power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

- J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- M. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.
- N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- O. Retain: To keep existing items that are not to be removed or dismantled.
- P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
- Q. Salvage: To protect removed or dismantled items and deliver them to City.
- R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- S. Strip: To remove existing finish down to base material unless otherwise indicated.

1.04 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to City that may be encountered during removal and dismantling work remain City's property. Carefully dismantle and salvage each item or object.

1.05 INFORMATIONAL SUBMITTALS

- A. Construction Schedule for Historic Treatments: Indicate for entire Project the following for each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces:
 - 1. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with other known work in progress.
 - 2. Coordination of City's partial occupancy of completed Work if applicable.
- B. Qualification Data: For historic treatment specialist, historic removal and dismantling specialist, historic removal and dismantling specialist's field supervisors, historic removal and dismantling specialist's workers.
- C. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

- D. Historic Treatment Program: Submit before work begins.
- E. Fire-Prevention Plan: Submit before work begins.
- F. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.

1.06 QUALITY ASSURANCE

- A. Historic Treatment Specialist Qualifications: An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to this work as specified in each section, and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrate the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site during times that historic treatment work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - 2. Worker Qualification: Persons who are experienced in historic treatment work of types they will be performing.
- B. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is not sufficient experience for historic removal and dismantling work.
- C. Bird-Excrement-Removal Specialist Qualifications: (Not applicable)
- D. Industrial Hygienist Qualifications: (Not applicable)
- E. Historic Treatment Program: Contractor to submit a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Technical Specification Sections.
 - 1. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- F. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with City's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.
- G. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Typical Patching Work: Typical patching of existing original exterior sandstone as shown on Drawings.
 - 2. Typical Restoration Work: Typical patching and refinishing of mosaic and terrazzo flooring in areas shown on drawings.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Designer specifically approves such deviations in writing.

- H. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.
- I. Standards: Comply with ANSI/ASSE A10.6.
- J. Historic Treatment Preconstruction Conference: Conduct conference at Project site.
 - 1. General: Review methods and procedures related to historic treatment including, but not limited to, the following:
 - a. Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.
 - b. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
 - c. Review qualifications of personnel assigned to the work and assign duties.
 - d. Review material application, work sequencing, tolerances, and required clearances.
 - e. Review areas where existing construction is to remain and requires protection.
 - 2. Removal and Dismantling:
 - a. Inspect and discuss condition of construction to be removed or dismantled.
 - b. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

1.07 STORAGE AND PROTECTION OF HISTORIC MATERIALS

- A. Salvaged Historic Materials:
 - 1. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
 - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 - 3. Store items in a secure area until delivery to City.
 - 4. Transport items to City's storage area designated by Project Manager.
 - 5. Protect items from damage during transport and storage.
- B. Historic Materials for Reinstallation:
 - 1. Repair and clean historic items as indicated and to functional condition for reuse.
 - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.
- C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Designer, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

- D. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weather tight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.
 - 1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
 - 2. Secure stored materials to protect from theft.

1.08 **PROJECT CONDITIONS**

- A. General Size Limitation in Historic Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by [12 inches] <Insert dimension> or more.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by City as far as practical.
 - 1. Before removal and dismantling, City will remove the following items:
 - a. None.
- C. Notify Designer of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- D. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Project Manager and obtain specific direction regarding the suspected hazardous material from the City's Environmental Health Division.. City will remove hazardous materials under a separate contract.
 - a. In the case of suspected asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Re-assign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.
- E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

1.09 COORDINATION (Not applicable)

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.01 HISTORIC REMOVAL AND DISMANTLING SPECIALIST

- A. Historic Removal and Dismantling Specialist Firms: Subject to compliance with requirements, have historic removal and dismantling performed by a qualified firm with a minimum of five-years experience working with similar structures and materials.
- B. HISTORIC REMOVAL AND DISMANTLING EQUIPMENT
- C. Removal Equipment: Use only hand-held tools except as follows or unless otherwise approved by Designer on a case-by-case basis:
 - 1. Light jackhammers are allowed subject to Designer's approval.
 - 2. Large air hammers are not permitted.
- D. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Designer on a case-by-case basis:
 - 1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
 - 2. Pry bars more than 18 inches long and hammers weighing more than 2 lb are not permitted for dismantling work.

3.02 EXAMINATION

- A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
 - 1. Verify that affected utilities have been disconnected and capped.
 - 2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
 - 3. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures as a result of removal and dismantling work.
- B. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, and preconstruction videotapes (Optional).
- C. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.
3.03 **PROTECTION, GENERAL**

- A. Comply with temporary barrier requirements in Technical Specification Section 015000 "Temporary Facilities."
- B. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.
- C. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
 - 3. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
 - 4. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 5. Protect floors and other surfaces along haul routes from damage, wear, and staining.
- D. Temporary Protection of Historic Materials:
 - 1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
 - 2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Designer.
- E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- F. Utility and Communications Services:
 - 1. Notify Project Manager, Designer, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
 - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
 - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
- G. Existing Drains: (Not applicable)
- H. Existing Roofing: (Not applicable)

3.04 PROTECTION DURING APPLICATION OF CHEMICALS (Not applicable)

3.05 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following.
 - 1. Comply with NFPA 241 requirements unless otherwise indicated.

- 2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- 3. Prohibit smoking by all persons within Project work and staging areas except where specifically designated for smoking.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated:
 - 1. Obtain Project Manager's approval for operations involving use of welding or other high-heat equipment. Use of open-flame equipment is not permitted Notify Project Manager at least 72 hours before each occurrence, indicating location of such work.
 - 2. As far as practical, restrict heat-generating equipment to areas outside the building.
 - 3. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
 - 4. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 - 5. Fire Watch: Before working with heat-generating equipment or highly combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows.
 - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire watch perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work at each area of Project site to detect hidden or smoldering fires and to ensure that proper fire-prevention is maintained.
 - e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.
- C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watches are trained in fire-extinguisher and blanket operation.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
 - 1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is completed.

3.06 GENERAL HISTORIC TREATMENT

- A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
- B. Halt the process of deterioration and stabilize conditions unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program:
 - 1. Retain as much existing material as possible; repair and consolidate rather than replace.
 - 2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
 - 3. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
 - 4. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs or video recordings (Optional).
- C. Notify Designer of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Designer.
- D. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Designer.
- E. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
- F. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on Record Drawings.

3.07 HISTORIC REMOVAL AND DISMANTLING

- A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.
- B. Perform work according to the historic treatment program and approved mockup(s).
 - 1. Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
 - 2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
 - 3. Do not operate air compressors inside building, unless approved by Designer in each case.
 - 4. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
 - 5. Do not use explosives.

- C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
- D. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
- E. Removing and Dismantling Items on or near Historic Surfaces:
 - 1. Use only dismantling tools and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
 - 2. Unfasten items to be removed, in the opposite order from which they were installed.
 - 3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
 - 4. Dismantle anchorages.
- F. Masonry Walls: (Not applicable)
- G. Steelwork: (Not applicable)
- H. Loose Plaster: Identify loose, non-historic plaster and separate it from its substrate by tapping with a hammer and prying with a chisel or screwdriver. Do not use pry bars. Leave sound, firmly adhered plaster in place. Do not damage, remove, or dismantle historic plasterwork except where indicated or where it is an immediate hazard to personnel and as approved by Designer.
- I. Concrete Floor Surface Removal: Remove floor surfaces to the indicated lower elevations or cleavage planes as indicated on Drawings. Use dismantling methods when removing floor surfaces 12 inches or less away from historic walls. Take away material to a uniform surface at the indicated level.
- J. Marble and Travertine Flooring and Setting Bed Dismantling: (Not applicable)
- K. Anchorages:
 - 1. Remove anchorages associated with removed items.
 - 2. Dismantle anchorages associated with dismantled items.
 - 3. In non-historic surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
 - 4. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section specific to the historic surface being patched.

3.08 BIRD-EXCREMENT REMOVAL (Not applicable)

3.09 HISTORIC REMOVAL AND DISMANTLING SCHEDULE

A. Existing Items to Be Dismantled and Salvaged:1. [insert description].

3.010 HISTORIC TREATMENT SCHEDULE

- A. Surfaces requiring special care and treatment to ensure successful restoration are indicated on Drawings and generally described below.
 - 1. [Insert description].

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting the Schedule of Values as referenced in the General Conditions. The Schedule of Values will be built upon a breakdown of the Work using specification sections and milestones. The Work also includes the preparing and submitting of updated copies of the Schedule of Values if the Schedule of Values is affected by change orders. The Project Manager may require additional breakdowns of information, or separate Schedules of Values for portions of work based upon project's funding requirements.
- B. A Schedule of Stored Material is a detailed cost breakdown for permanent materials that will be temporarily stored prior to their being installed and for which the Contractor seeks partial payments. The Schedule of Stored Material will be incorporated as a part of the Schedule of Values.
- C. Within 14 calendar days of issuance of the Notice to Proceed, the Contractor shall submit the Schedule of Values including the Schedule of Stored Material if applicable. The Schedule of Values and Schedule of Stored Material used to prepare the work/cost breakdown for the Schedule will be used for the Contractor's billings.
- D. Any contract allowances shall be included in the Schedule of Values.
- E. Reference Special Contract Conditions, Payment to Contractors, plus Contract General Conditions, GC 902, GC 903, and GC 906.

1.02 RELATED DOCUMENTS

A. Technical Specifications Section 01 3000 Submittals

1.03 SUBMITTAL

- A. The Schedule of Values shall be submitted in a format approved by the Project Manager.
- B. Upon request by the City, the Contractor shall support values given with the data which will substantiate the correctness of the values.
- C. The Schedule of Values will be utilized as a basis for review of the Contractor's application for progress payment.

1.04 REVIEW AND RESUBMITTAL

A. If review by the City indicates that changes to the Schedule of Values are required, the Contractor shall revise and resubmit the Schedule of Values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

3.01 ALLOWANCE AUTHORIZATION AND PAYMENT

- A. Contractor shall request written approval for expenditure of any contract allowances PRIOR TO performing the Work involved. List work to be performed and estimated cost in the requesting correspondence.
- B. Using the format provided by the City, the Contractor's request for payment of all contract allowances shall be included in the Schedule of Values.

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section identifies the Quality Control activities to be performed during all phases of the contract by the Contractor.
- B. The Contractor shall have in place his Quality Control Program as necessary to ensure that all materials and work are completed in compliance with contract documents. The Contractor is solely responsible for Quality Control with the exception of those tests and/or audits that will be conducted by the City as defined in the contract documents.
- C. Test schedules and/or testing requirements for materials used on this project are included in the technical specifications. Laboratory and field testing identified in the technical specifications shall be conducted by an Independent Testing Agency (ITA) retained by the City unless stated otherwise.
- D. Reference General Contract Conditions GC 316, GC 702, GC 1801, GC 1902, and GC 2002

1.02 LEVEL OF CONTROL

- A. The intent of this section is to enable the Contractor to establish a necessary level of control that will:
 - 1. Adequately provide for the production of acceptable quality materials
 - 2. Provide sufficient information to ensure both the Contractor and the Designer of Record that the specification requirements are being met
 - 3. Allow the Contractor as much latitude as possible to develop his or her own standards of control.

1.03 SUBMITTALS

- A. Refer to Technical Specification Section 01 3000 and013400 for submittal requirements.
- B. Quality Control Plan: Within 14 days after Notice to Proceed, the Contractor shall submit a Quality Control Plan for review and acceptance. Acceptance by the Project Manager does not relieve the Contractor of compliance with the contract requirements. The Contractor Quality Control Plan shall address the following as a minimum:
 - 1. Provide a general description of Quality Control monitoring to be performed until final acceptance by the City. Include securing of project site and staging areas and monitoring of the worksite during times no construction activity is scheduled to take place.
 - 2. The Contractor shall designate an employee as the Quality Control Manager qualified to perform quality control monitoring of the Work. The designated individual shall have the authority to direct work changes required to bring the Work into conformance with contract requirements including stopping non-conforming work in progress.
 - 3. Provide methodology of monitoring, testing and exercising of all equipment, valves and/or assemblies to ensure the Work installed is in proper working order.

- 4. The Contractor shall submit a list of suppliers and subcontractors. This list shall include items to be supplied by each supplier and/or subcontractor and shall identify work to be performed by each subcontractor. The list shall be updated and resubmitted as required.
- 5. Provide emergency contact information including name, company, title, work phone number, cell phone number and other means of contact. The Emergency Contact list shall include at least four individuals. In the event there is any change in any of the information, the Contractor shall forward the updated list to the Project Manager. The Emergency Contact list shall include the project address, project title and date of issue.
- C. Daily Quality Control Report:
 - 1. The Daily Quality Control Report shall be submitted daily in the format detailed in Technical Specifications Section 01999. The report shall address as a minimum the following: identify number of workers on site each day by trade, identify notifications and discussions with/by Quality Assurance Inspectors and other agency inspectors, identify quality of work placed that day and any deviations and/or corrections required to bring the Work into conformance with the contract. Daily reporting may be computerized or typed, but must contain a legible signature. Scanned copies of daily reports are acceptable.
 - 2. Submit one electronic copy of the Daily Quality Control Report to the Project Manager the day following the work. The report shall be signed by the Contractor's Quality Control Representative and the Contractor's Superintendent.
- D. Corrective Action Report (CAR)
 - Conditions adverse to quality will be reviewed by the Contractor to determine the cause and to recommend a corrective action that will preclude recurrence. The condition, its cause and the corrective action planned shall be reported to the Project Manager prior to implementation. Follow-up action shall be taken to verify implementation of the corrective action. The Contractor will document the corrective action and a copy of the Corrective Action Report (CAR) will be transmitted to the Project Manager.

1.04 DOCUMENTATION

- A. The Contractor shall not change or alter approved submittals, procedures, specifications, drawings or other pertinent documentation without the Project Manager's written authorization.
- B. All records and documents that are quality related shall be prepared, identified and maintained by the Contractor and shall be made available to the City upon request. Records shall be protected from damage, deterioration or loss.
- C. The Contractor shall maintain records at the actual worksite and at Contractor's office to show the inspection status of materials and items installed in order to ensure that the required inspections and tests have been performed in a timely and correct manner.

1.05 INSPECTIONS AND TESTS

A. Inspections, tests and system shut down requests, conducted by persons or agencies other than the Contractor, shall not in any way relieve the Contractor of his responsibility and obligation to meet all specifications and the referenced standards. The Contractor's designated Quality Control Representative shall inspect the work and shall ensure the work complies with the contract requirements prior to any requests for inspection or testing.

- B. When the specifications, laws, ordinances, rules, regulations or orders of any public agency having jurisdiction require the ITA's surveillance of inspections or tests, the Contractor shall notify the ITA of the place, date and time 48 hours prior to the inspection and/or test. The Contractor shall be responsible for notifying and requesting inspection by other agencies including but not limited to the Denver Building Inspection Division, Denver Fire Department and Denver Water Department. Prior to request for other agency inspections, the Contractor shall meet and plan inspection times with the Project Manager and or the Project Manager's designated representative.
- C. Special inspections or tests may be required by the technical specifications, City, State and/or Federal Agencies in addition to those tests already performed. The Contractor shall notify the Project Manager at least 48 hours in advance of the additional inspections or tests.

1.06 INSPECTION PLAN

- A. The Contractor shall utilize the following six-point inspection plan to ensure the conformance of the Work performed by the Contractor meets the requirements of the contract drawings and specifications, the referenced codes and standards and the approved submittals:
 - 1. Prework Coordination: Prior to the start of construction work on the contract and prior to the start of work under each separate specification section and prior to the start of work where a change in a construction operation is contemplated by the Contractor and prior to a new subcontractor starting work, a coordination meeting will be held with the Contractor's superintendent, Quality Control and Safety representative(s). Some portions of the work may require coordination with the Project Manager, facility operator, Designer of Record, ITA and/or commissioning agent; this would be included as an activity in the regularly updated schedules and specific invitations will be issued by the Contractor. The Contractor's Quality Control meetings. Meeting minutes shall be electronically distributed within 48 hours of the meeting.
 - 2. The purpose of the meeting is to ensure that the Contractor's personnel and subcontractors have no misunderstandings regarding their safety and quality procedures as well as the technical requirements of the contract.
 - 3. Initial Inspection: Upon completion of a representative sample of a given feature of the Work and no later than two weeks after the start of a new or changed operation, the Project Manager's designated representatives will meet with the Contractor's Quality Control representative and applicable subcontractor's supervisor and their Quality Control representatives to check the following items, as a minimum:
 - a. Workmanship to established quality standards
 - b. Conformance to contract drawings, specifications and the accepted shop drawings
 - c. Adequacy of materials and articles utilized
 - d. Results of inspection and testing methods
 - e. Adequacy of as-built drawings maintained daily.
 - 4. Once accepted, the representative sample will become the physical baseline by which ongoing work is compared for quality and acceptability. To the maximum practical extent, approved representative samples of work elements shall remain visible until all work in the appropriate category is complete. Acceptance of a sample does not waive or alter any contract requirements or show acceptance of any deviation from the contract not approved in writing by a fully executed change order.
 - 5. Follow-up Inspection: The Contractor's Quality Control representative will monitor the work to review the continuing conformance of the work to the workmanship standards

established during the preparatory and initial inspections.

- 6. Pre-Final Acceptance Inspection: Prior to requesting a Pre-Final Acceptance Inspection by the City, all work and operational systems to be inspected shall be satisfactorily completed and tested by the Contractor. The Contractor's written request for this inspection shall be made 72 hours in advance. With the request shall come a list of any known deficiencies and when they will be corrected. If the list is too large or contains too many significant items, in the opinion of the Project Manager, no inspection will be held because of the incompleteness of the work.
- 7. The Project Manager will schedule the Pre-Final Acceptance Inspection and will prepare a list of deficient items (punch list) discovered during the inspection. If during the inspection the list becomes too large or too many significant items are on the list, the inspection will be canceled. After the inspection is completed, the Deficiency List will be transmitted to the Contractor for correction of the deficient items.
- 8. Final Acceptance Inspection: After the Contractor has completed all items on the Deficiency List (generated from the Pre-Final Acceptance Inspection) he shall request a Final Acceptance Inspection. The request shall be made in writing at least 72 hours in advance of the inspection. All areas must be cleaned and ready for turnover prior to this inspection. The Project Manager, the design consultant, the facility operator, a representative of the funding agency (if applicable) and other interested parties will inspect the subject Work to ensure that all deficiencies have been satisfactorily attended to and that no new deficiencies have appeared and that all systems are completely functional. Any outstanding or additional deficient items will be noted and handled per the requirements of the Pre-Final Acceptance Inspection noted above until the Work is acceptable to the Project Manager.

1.07 SAMPLES

- A. The Contractor shall maintain at the worksite a copy of all samples submitted and accepted by the City. Samples shall be made available to the designer or the Project Manager's designated representatives for review and comparison in the field. The Project Manager prior to use on the project must accept all items and materials.
- B. The installed work will be compared to the samples and if any of the work is not of the same quality, material, finish, color, texture or appearance as the sample, that portion that is not the same will be considered defective and in nonconformance.
- C. Contractor selection of samples will only be considered if taken at random. The Contractor shall permit representatives of the City to witness the selection of samples. Inspection or tests of items or materials that fail shall be sufficient cause to terminate further inspections/tests of the same brand, make or source of that product.
- D. The Contractor is obligated to correct any item deemed deficient.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 REQUIREMENTS

- A. All materials required for the contract shall be new except where specified otherwise. Inspections and tests performed by the City shall not relieve the Contractor from the responsibility to meet the specifications, nor shall such inspections/tests be considered a guarantee for acceptance of materials that will be delivered at a later time.
- B. The Contractor is obligated to correct or remove non-conforming materials, whether in place

or not. If necessary, the Project Manager will send written notification to the Contractor to correct or remove the defective materials from the project. If the Contractor fails to respond, the Project Manager may order correction, removal and/or replacement of defective materials by others, in which case the Contractor shall bear all costs incurred by such actions.

- C. Materials accepted on the basis of a Certificate of Compliance may be sampled and inspected/tested by the City Project Manager or its Designer at any time. The fact that the materials were accepted on the basis of such certification shall not relieve the Contractor of his responsibility to use materials that conform to the specifications.
- D. The Contractor shall impose upon his suppliers the same quality control requirements, including inspection and test procedures, as imposed upon him by the specifications and referenced standards. The Contractor shall apply appropriate controls, designed to ensure that all materials supplied meet the requirements and specifications.

QUALITY ASSURANCE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section identifies inspection activities to be performed by inspectors employed by the City and/or working under the direction of the City Project Manager.
- B. Inspection and tests, conducted by persons or agencies other than the Contractor, shall not in any way relieve the Contractor of his responsibility and obligation to meet all specifications and the referenced standards.
- C. The inspection and approval of work by other agencies above does not constitute inspection or acceptance of work required by the City. Technical specifications may contain requirements more stringent than Building Inspection Division or other code agency requirements.
- D. Reference Contract General Conditions, GC 1701, GC 1702, GC 1703, GC 1704, GC 1705, GC 1706

1.02 RELATED DOCUMENTS

- A. Technical Specifications Section 01 4000 "Contractor Quality Control"
- B. Technical Specifications Section 01 3000 "Submittals"
- C. Technical Specifications Section 01 3400 "Shop and Working Drawings, Product Data and Samples"

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S QUALITY CONTROL SYSTEM

- A. The Contractor is responsible for quality control of the Construction. All acquisition of materials, sequence of construction (except as otherwise indicated), and means and methods of construction shall be the responsibility of the Contractor. Establish system to perform sufficient inspection and tests of all items of work, including that of subcontractors, to ensure conformance to Contract Documents for materials, workmanship, construction, finish, functional performance and identification.
 - 1. Control System: Establish for all construction except where Contract Documents provide for specific compliance tests by testing laboratories and engineers employed by the City.
 - 2. Control System: Specifically include all testing required by various sections of Specifications.
 - 3. Quality Control System: Means by which Contractor assures himself that construction complies with requirements of Contract Documents.
 - a. Controls: Adequate to cover all construction operations and keyed to proposed

construction schedule.

- B. The Contractor shall be responsible for assuring compliance with the quality standards as indicated in the Contract Documents. In addition, the Contractor shall be responsible for:
 - 1. Review of submittals prior to their being forwarded to the Designer for review. The Contractor shall mark submittals with comments and shall indicate the date and party conducting the Contractor's review of each submittal.
 - 2. Final inspection of the project prior to calling for the City to conduct a final inspection. The Contractor shall provide his inspection comments to the Designer and City prior to the scheduled final inspection.
 - 3. Verification of completion of punch-list items prior to calling for verification inspection by the Designer and the City.
- C. Records: Maintain correct records on appropriate form for all inspections and tests performed, instructions received from the Designer or Independent Testing Agency (ITA) and actions taken as result of those instructions.
 - 1. Records: Include evidence that required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective action taken.
 - 2. Document inspections and tests as required by each section of Specifications.
- D. The Contractor is responsible for complying with the requirements of the Contract Documents. Testing performed by the City's Agents shall not be relied upon by the Contractor as sufficient to assure compliance with the Contract Documents. The Contractor shall procure and pay for testing necessary to assure that the construction is in compliance with the Contract Documents.

3.02 STANDARDS

- A. Generally accepted Construction Industry standards for materials, products, quality, and workmanship shall supplement the Specifications.
 - 1. Where industry standards are less than the Specifications and Drawings require, the Contract Documents shall govern.
 - 2. The Contractor shall provide materials and products which conform to industry standards of quality.
- B. Construction tasks shall be performed by craftsmen skilled and experienced in the trades required. Work shall be subject to review by the City and the Designer.
- C. Work and/or materials which fail to meet accepted industry standards of performance, quality, and/or appearance will be rejected and shall be brought into compliance or replaced by the Contractor at no additional cost to the City.

3.03 MATERIAL AND WORKMANSHIP

- A. Unless otherwise specified, or indicated on the Drawings, material shall be new, of best quality, and without flaws, and delivered upon completion in an undamaged condition.
- B. Workmanship shall be the best of its respective kind. Labor shall be performed in a thorough workmanlike manner by qualified, efficient, and skilled mechanics, acceptable to the City, Designer and other trades involved on the job requiring acceptable substrate for the performance of their work.

3.04 TESTING – GENERAL

- A. Testing Laboratory and/or Engineering services are required for quality control in portions of the work identified in other sections of these specifications.
- B. Tests required by these Specifications shall be performed in strict accordance with referenced testing methods, procedures, and conditions. Pertinent data shall be included in clear, comprehensive written forms according to the Designer's or Engineer's requirements.
- C. Contractor: Provide equipment and facilities as required for testing at no additional cost, subject to City's review, for conducting field tests and for collecting and forwarding samples.
 - 1. Do not use materials or equipment represented by samples until tests, if required, have been made and materials or equipment found to be acceptable.
 - 2. Do not incorporate any product into work which becomes unfit for use after acceptance thereof.
- D. Testing: Materials or equipment proposed to be used may be tested at any time during their preparation or use. Furnish required samples without charge and give sufficient notice of placing of orders to permit testing. Products may be sampled either prior to shipment or after being received at site of work.
- E. Tests: Made by accredited testing laboratory selected by City. Except as otherwise provided, sampling and testing of materials and laboratory methods and testing equipment shall be in accordance with latest standards and tentative methods of ASTM.

3.05 COST OF TESTING

- A. Unless indicated otherwise, City's testing shall be performed by the City's authorized agents, at the City's expense.
- B. Costs for re-testing of non-complying work shall be borne by the Contractor.
- C. According to the judgment of the City and/or Designer, ANY portion of the work in this contract may be tested at any time for any reason. Costs for such testing shall be borne by the Contractor only if such tests indicate that work does not meet Contract Document requirements.

3.06 OTHER TESTING

- A. Following Testing: Performed at expense of Contractor:
 - 1. Any additional tests required because of any tests that fail subject to following conditions:
 - a. Quantity and Nature of Tests: Determined by the Designer.
 - b. Tests: Taken in presence of the City and/or the Designer.
 - c. Proof of Noncompliance: Contractor liable for corrective action which the City and/or the Designer feel is required including complete removal and replacement of defective material.
 - 2. Material Substitution: Any tests of material or equipment offered as substitute for specified item on which test may be required in order to prove its compliance with Specifications.
- B. Contractor: May have tests performed on material and equipment for his own information and job control so long as the City does not assume responsibility for costs or for giving

them consideration when appraising quality of materials.

3.07 EQUIPMENT TESTING

- A. Equipment testing shall be as determined appropriate by the City to assure proper performance according to the manufacturer's specifications for each equipment item.
- B. After all utility connections to equipment are completed, the Contractor shall conduct final tests of equipment in presence of the City and the Designer.
- C. Unless waived in writing by the City, the requirements of this section shall apply to all installed equipment items having utility connections.

3.08 NOTIFICATION

- A. The Contractor shall be responsible for notifying the City and Designer at least three (3) working days prior to commencing work which is identified as requiring testing in their presence.
- B. The Contractor shall be responsible for scheduling and coordinating all required testing with the City and the City's Independent Testing Agency.

3.09 TEST REPORTS

- A. Test reports, whether performed for the City or the Contractor, shall be submitted to the City, the Designer, and Contractor as soon as results are available. Reports shall be clear, concise, comprehensive written forms containing required test results.
- Reports of tests made by testing laboratories shall be distributed via e-mail by testing laboratory as follows: to – City Project Manager, – Contractor, - Applicable Supplier or Subcontractor; – Designer and Applicable Engineer;

3.10 MANUFACTURING AND FABRICATION INSPECTIONS

- A. The Project Manager may elect to perform additional inspections and/or tests at the place of the manufacture, the shipping point or at the destination to verify conformance to applicable specifications. Inspections and tests performed by the City shall not relieve the Contractor from the responsibility to meet the specifications, nor shall such inspections/tests be considered to be a guarantee for acceptance of materials that will be delivered at a later time.
- B. The Project Manager or his authorized representative may inspect at its source any material or assembly to be used in the Work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the Work and to obtain samples for testing and further inspection.
- C. Should the Project Manager conduct plant inspections the following conditions shall exist:
 - 1. The Project Manager shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- D. It is understood and agreed that the City shall have the right to re-test at the City's expense any materials that have been tested and accepted at the source of supply after it has been delivered to the site.

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of furnishing, installing, operating, maintaining and removing temporary construction barriers, enclosures and field facilities including the Contractor's construction offices, staging areas, yards, storage areas, electrical power, telephone, water, fire protection and sanitary service.
- B. Construction Office, Yards and Storage Areas
 - 1. Temporary facilities which the Contractor desires to locate in staging areas adjacent to the Work or within the project limits are subject to approval by the Project Manager.
 - 2. Contractor Field Office may be required based upon size and complexity of project, if required:
 - a. Space within the Denver Central Library can be provided
 - b. GC to provide wireless hotspot for all Project related staff (do not count on DPL WiFi)
- C. Electrical Service
 - 1. Reference Contract General Conditions, GC 327
 - 2. Provide lighting and power for field offices, storage facilities and other construction facilities and areas.
 - 3. Provide power centers for electrically operated and controlled construction facilities including tools, equipment, testing equipment, interior construction lighting, heating, cooling and ventilation equipment.
 - 4. Provide night security lighting at secured areas within construction limits at offices, storage facilities, temporary facilities and excavated areas.
 - 5. Provide battery operated or equivalent emergency lighting facilities at construction areas where normal light failures would cause employees to be subjected to hazardous conditions. Bear all costs of temporary electric and water service permits, fees and deposits required by the governing authorities, and connection charges and temporary easements including installation, maintenance and removal of equipment.
- D. Telephone Service
 - 1. The Contractor shall furnish, field staff cell phones
- E. Internet Service
 - 1. The Contractor shall furnish, install and maintain at least one computer with email in his main field office. This computer should be able to access all email and FTP as part of project submittal process.
- F. Water Service
 - 1. Reference Contract General Conditions, GC 327
 - 2. The Contractor shall make all connections and extensions required and shall make use of water in direct support of the Work. The Contractor shall install an approved

Water Department tap at the City's water source prior to obtaining any water. The Contractor shall arrange and pay for its supply/distribution system from the City's point of connection. The location and alignment of the Contractor's temporary supply/distribution system must be approved by the Project Manager prior to its installation. The Contractor shall leave in place all above ground and underground water distribution facilities unless otherwise directed by the Project Manager.

- 3. The Contractor shall not use in place fire hydrants or standpipes as sources for construction water or potable water.
- G. Fire Protection
 - 1. Furnish, install and maintain temporary portable fire protection equipment throughout the construction period at all buildings (including the project site), maintenance shops, and fuel storage on all large construction equipment and at the location of any flammable materials or construction materials.
- H. Sanitary Service
 - 1. Reference Contract General Conditions, GC 326
 - 2. Furnish, install and maintain temporary sanitary facilities and services throughout the construction period.
 - 3. Ensure that separate or single user toilets shall be provided to ensure privacy between the sexes.
 - 4. Provide general washing facilities adequate for the number of employees.
 - 5. Provide special washing facilities adequate for the number of employees engaged in the application of paints, coating and other volatile or hazardous materials.

1.02 QUALITY CONTROL

A. Provide products for, and the execution of, the Work of this Section that will satisfy the requirements of the NEC, OSHA and local codes. Provide products that satisfy requirements of NEMA and are UL listed.

1.03 SUBMITTALS

- A. Refer to Technical Specifications Sections 01 3000 and 01 3400 for submittal procedures.
 - 1. Details and layout of temporary installations including fences, roads, parking, buildings, storage areas and drainage plans.
 - Lighting plan showing temporary lighting facilities, electrical service panel location, electrical circuit diagram and anticipated light level on the working roadway, pathway or construction surface.

PART 2 - PRODUCTS

2.01 ELECTRICAL SERVICE

- A. Provide temporary power and lighting equipment consisting of fixtures, transformers, panel boards, groundings, lamps, switches, poles, conduits and wiring sized and capable of continuous service and having adequate capacity to ensure a complete operating system. Comply with NEMA.
- B. Provide temporary extension cords to supply tools not longer than 200 feet, except that additional length may be used if equipment will be grounded within 200 feet of tool or power.

C. Portable power generators shall be grounded.

2.02 DRINKING WATER SERVICE

A. Provide sanitary materials and equipment that satisfies the requirements of codes and regulations pertaining to temporary water systems. Bottled products may be used if those products comply with codes. Clearly label portable containers having a dispensing tap and used only for drinking water. Provide single service disposable cups and a sanitary container for dispensing cups. A trash receptacle shall be provided and maintained beside each portable water supply.

2.03 FIRE PROTECTION

A. Fire extinguishers shall be UL rated and shall comply with the current City fire code.

2.04 SANITARY SERVICE

- A. Provide materials and equipment adequate for the intended purposes, which will neither create unsanitary conditions nor violate the codes applicable to temporary sanitary facilities. Enclosures for toilet and washing facilities shall be weatherproof, sight proof, ventilated and sturdy.
- B. Provide portable type toilet facilities that satisfy the requirements of OSHA.
- C. Provide washing facilities as needed. Furnish soap, single-service paper towels, towel dispenser and towel receptacle. If paints, coatings and other volatile or hazardous materials injurious to humans will be applied as part of the contract, provide washing facilities with warm water of approximately 120 degrees F.

PART 3 - EXECUTION

3.01 ELECTRICAL SERVICE

A. The approximate location of primary power lines is shown on the Construction Drawings. The Contractor shall locate electrical service where it will not interfere with equipment, storage spaces, traffic, and prosecution of the Work or the work of others. Installation shall present a neat and orderly appearance and shall be structurally sound. Maintain service in a manner that will ensure continuous electrical service and safe working conditions.

3.02 TELEPHONE SERVICE

A. Install temporary telephone service in a neat and orderly manner and make structurally and electrically sound to ensure continuous service. Modify, relocate and extend as work progress requires. Place conduit and cable where those products will not interfere with traffic, work areas, materials, handling equipment, storage areas and the work of other contractors. Service lines may be aerial.

3.03 WATER SERVICE

- A. Install the systems in a neat and orderly manner. Make them structurally and mechanically sound. Provide continuous service. Modify, relocate and extend the systems as the work progresses.
- B. Locate systems where they will be convenient to work stations, sanitary facilities and first aid station but will not interfere with traffic, work areas, materials handling equipment, storage areas or the work of other contractors.

- C. Install vacuum breakers, backflow preventers and similar devices in a manner and location which will prevent temporary water from returning to the water mains.
- D. Do not incorporate any part of temporary water distribution system into the permanent water distribution system.

3.04 FIRE PROTECTION

- A. Install products in conformance with the requirements of the applicable Denver Fire Department and OSHA regulations.
 - 1. Provide functional fire extinguishers that are clearly identified for fire and an accessible supply of water during the period of construction. These fire extinguishers shall remain in place until permanent fire protection systems are functional.
 - 2. Furnish not less than one 20-pound fire extinguisher, type 2A-20ABC within ten feet of cutting and welding operations.
 - 3. Provide 20-pound fire extinguishers, type 2A-20ABC no further then 100 feet apart in buildings.
 - 4. Provide not less than one 20-pound fire extinguisher, type 2A-20ABC on any equipment of 75 horsepower or more.
- B. Instruct construction personnel as to location and use of temporary fire protection equipment.
- C. Fire extinguishers shall be located for easy access. Their location shall be clearly marked so that they can be seen at least 75 feet away.

3.05 SANITARY SERVICE

- A. Place temporary sanitary (and washing) facilities in a neat and orderly manner within the limits of the work and convenient to the work stations. Make these facilities structurally and mechanically sound. Modify, relocate and extend the facilities as required by progress of the work.
- B. Service toilets at those time intervals which will minimize the accumulation of wastes and prevent creation of unsanitary conditions, but not less than once a week.
- C. The waste from the sanitary and wash facilities shall be disposed of in accordance with all applicable rules, regulations and laws and with the least environmental impact.

3.06 FENCING

- A. Contact all utility service companies prior to planning fence location and post locations for certification of current utilities. Locate pothole posts planned within 5 feet of known utilities. Submit fencing plan and typical details to Project Manager at least seven days before planned execution for review and acceptance.
 - 1. Construction: Commercial grade chain link fence.
 - 2. Provide minimum 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

3.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate ac

ceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons.

B. Provide access doors with self-closing hardware and locks.

3.08 SIGNAGE

A. Contractor shall not provide any signage for temporary facilities without prior approval from the Project Manager.

3.09 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable noncombustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

3.10 REMOVAL

- A. The Contractor shall locate all temporary facilities including the underground utilities so they can be completely removed without damaging permanent work or the worksite of other contractors.
- B. The Contractor shall remove all temporary facilities, including all underground utilities, and restore the site to the condition in which the City initially provided it to the Contractor.

STORAGE AND PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of providing storage and protection of the materials, products and supplies which are to be incorporated into the construction and indicating such storage areas on the working drawings with the location and dates when such areas will be available for each purpose.
- B. Reference Contract General Conditions, GC 803

1.02 SUBMITTALS

- A. Refer to Technical Specifications Sections 01 3000 and 01 3400 for submittal procedures. Submit concurrently with submittals required in Section 01 0500.
- B. Submit working drawings showing locations of storage areas not indicated on the Contract Drawings.
- C. Submit descriptions of proposed methods and locations for storing and protecting products.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials required for the storage and protection of the items specified shall be durable, weatherproof and either factory finished or painted to present an appearance acceptable to the City. Storage facilities shall be uniform in appearance with similar materials used to the maximum extent possible.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS OF EXECUTION

- A. Palletize materials, products and supplies which are to be incorporated into the construction and stored off the ground. Store these items in a manner which will prevent damage and which will facilitate inspection. Leave seals, tags and labels intact and legible. Maintain access to products to allow inspection. Protect products that would be affected by adverse environmental conditions.
- B. Periodically inspect stored products to ensure that products are being stored as stipulated and that they are free from damage and deterioration.
- C. Do not remove items from storage until they are to be incorporated into the Work.
- D. The Contractor shall ensure that all protective wrappings and coverings are secure and ballasted to prevent any items from deterioration and/or subsequent dislodgment. All items on the worksite that are subject to becoming windborne shall be ballasted or anchored.

3.02 HANDLING AND TRANSPORTATION

A. Handling

- 1. Avoid bending, scraping or overstressing products. Protect projecting parts by blocking with wood, by providing bracing or by other approved methods.
- 2. Protect products from soiling and moisture by wrapping or by other approved means.
- 3. Package small parts in containers such as boxes, crates or barrels to avoid dispersal and loss. Firmly secure an itemized list and description of contents to each container
- B. Transportation
 - 1. Conduct the loading, transporting, unloading and storage of products so that they are kept clean and free from damage.

3.03 STORAGE

- A. Store items in a manner that shall prevent damage to the owner's property. Do not store hydraulic fluids, gasoline, liquid petroleum, gases, explosives, diesel fuel and other flammables in excavations, except one day's supply of diesel fuel may be stored in open excavations.
- B. Provide sheltered weather-tight or heated weather-tight storage as required for products subject to weather damage.
- C. Provide blocking, platforms or skids for products subject to damage by contact with the ground.
- D. All material shall be stored according to the manufacturer's recommendations. Any material that has to be stored within specified temperature or humidity ranges shall have a 24-hour continuously written recording made of the applicable condition. Should the recording show that the material was not stored within the recommended ranges the material shall be considered defective and in nonconformance. If a certification from the manufacturer's engineering design representative is provided stating that the actual variations are acceptable and will in no way harm the material or affect warranties, then the deficiency will be considered corrected.
- E. Store hazardous material separately, with all material marked with a label showing the hazard and how to treat exposure to the material.

3.04 LABELS

A. Storage cabinets and sheds that will contain flammable substances and explosive substances shall be labeled FLAMMABLE--KEEP FIRE AWAY and NO SMOKING with conspicuous lettering and conforming to OSHA requirements.

SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of submitting for the approval of a different material, equipment or process then is described in the Contract Documents.
- B. If the substitution changes the scope of work, contract cost or contract time, a change order is required. As-built drawings and specifications must include all substitutions even if a change order is not issued.
- C. Reference Contract General Conditions, GC 406.

1.02 QUALITY CONTROL

- A. The substitution must provide the same quality as what it is replacing. The level of quality is defined by:
 - 1. Maintenance and operating cost
 - 2. Reliability
 - 3. Durability
 - 4. Life expectancy
 - 5. Ease of cleaning
 - 6. Ability to be upgraded as needed
 - 7. Ease of interacting with other systems or components
 - 8. Ability to be repaired
 - 9. Availability of replacement parts
 - 10. Established history of use in similar environments
 - 11. Performance equal or superior to that which it is replacing.

1.03 SUBMITTAL

- A. Refer to Technical Specifications Sections 01 3000 and 01 3400 for submittal procedures.
- B. A complete request for substitution must be made at least 60 days prior to when an order needs to be placed or a method needs to be changed.
- C. The submittal shall contain, as appropriate, detailed product data sheets for the specified items and the substitution. Samples and shop drawings shall also be submitted of the substitution as applicable. The submittal shall contain all the data required to be submitted for acceptance of the originally specified item or process.
- D. The submittal shall contain all the applicable information required in Technical Specifications Section 01 6300, paragraph 2.01 below.
- E. A signed statement as outlined in Technical Specifications Section 01 6300, paragraph

2.03.B below must accompany the Request for Substitution.

PART 2 - EXECUTION

2.01 INFORMATION

- A. Provide the following information as applicable with the Request for Substitution on the item or process that is being requested to be substituted:
 - 1. A complete description of the item or process
 - 2. Utility connections including electrical, plumbing, HVAC, fire protection and controls
 - 3. The physical dimensions and clearances
 - 4. A parts list with prices
 - 5. Samples of color and texture
 - 6. Detailed cost comparisons of the substitution and the contract specified item or process
 - 7. Manufacturer warranties
 - 8. Energy consumption over a one-year period
 - 9. What local organization is certified to maintain the item
 - 10. Performance characteristics and production rates
 - 11. A list of any license fees or royalties that must be paid
 - 12. A list of all variations for the item or method specified
 - 13. A list of at least three other projects of similar nature to this contract where the products or methods have been in use for at least one year including telephone number and name of the person to contact at these other projects
 - 14. An analysis of the effect of the substitution on the schedule and contract cost and on the overall project as it relates to adjoining work.

2.02 SUBSTITUTION REQUEST

- A. The formal Request for Substitution will be evaluated by the Project Manager and the Designer of Record based on the following criteria:
 - 1. Compatibility with the rest of the project
 - 2. Reliability, ease of use and maintenance
 - 3. Both initial and long term cost
 - 4. Schedule impact
 - 5. The willingness of the Contractor to share equally in any cost savings
 - 6. The ability of the item or process to meet all applicable governing regulations, rules and laws along with funding agency requirements
 - 7. The cost of evaluating the substitution.
- B. Based upon the above evaluation the Project Manager will make a final determination of what is in the best interest of the City and either approve, disapprove or approve as noted the requested substitution.

2.03 CONDITIONS

- A. As a condition for submitting a Request for Substitution the Contractor waives all rights to claim for extra cost or change in contract time other than those outlined in the request and approved by the Project Manager. The Contractor, by submitting a Request for Substitution, also accepts all liability for cost and scheduling impact on other contractors or the City due to the substitution.
- B. Included with the Request for Substitution shall be the following statement:
 - 1. "The substitution being submitted is equal to or superior in all respects to the contractrequired item or process. All differences between the substitution and the contractrequired item or process are described in this request along with all cost and scheduling data."
- C. The statement shall be signed and dated by the Contractor's Superintendent.

PART 3 - EXECUTION (NOT USED)

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work specified in this Section includes procedures required prior to Final Acceptance of the Work in addition to those specified in General Conditions Title 20 and Technical Specifications Section 01 7200.
- B. Reference Special Contract Conditions, Liquidated Damages, and Contract General Conditions, GC 602, GC906, GC 909, GC 910, GC 2003.

1.02 PREPARATION FOR FINAL INSPECTION

A. Before requesting inspection for Final Acceptance of the Work by the City, inspect, clean and repair the Work as required.

1.03 FINAL INSPECTION

- A. When the Contractor considers that the Work is complete, he shall submit written certification that:
 - 1. All punch list items have been completed.
 - 2. All clean up at the project site has been accomplished.
 - 3. Work has been inspected by the Contractor for compliance with contract documents.
 - 4. Work has been completed in accordance with contract documents.
 - 5. Work is ready for final inspection by the City.
 - 6. All as-built required documents have been submitted and accepted.
 - 7. All damaged or destroyed real, personal, public or private property has been repaired or replaced.
 - 8. All operation and maintenance manuals have been submitted and accepted and all training has been completed.
- B. The Project Manager and/or the Designer of Record will inspect to verify the status of completion with reasonable promptness after receipt of such certifications. If the Project Manager and/or the Designer of Record finds incomplete or defective work:
 - 1. The Project Manager may, at the Project Manager's sole discretion, either terminate the inspection or prepare a punch list and notify the Contractor in writing, listing incomplete or defective work.
 - 2. The Contractor shall take immediate steps to remedy stated deficiencies and send a second written certification to the Project Manager that Work is complete.
 - 3. The Project Manager and the Designer of Record will then re-inspect the Work.

1.04 REINSPECTION FEES

- A. Should the Project Manager perform re-inspection due to failure of the Work to comply with the claims of status of completion made by the Contractor:
 - 1. The Contractor shall compensate the City for such additional services at the rate iden

tified in the Special Contract Conditions, Liquidated Damages,

2. The City shall deduct the amount of such compensation from the final payment to the Contractor.

1.05 FINAL CHANGE ORDER

- A. If required, the Project Manager will prepare a final change order, reflecting approved adjustments to the Contract sum which were not previously made by change orders including the following:
 - 1. . Additions and deductions resulting from:
 - a. Allowances.
 - b. Final quantities for unit price items. Along with this statement shall be detailed backup for the quantities.
 - c. Deductions or corrected work.
 - d. Penalties.
 - e. Deductions for liquidated damages.
 - f. Deductions for re-inspection payments.
 - g. City resurveys required due to the Contractor.
 - h. Other adjustments.

1.06 FINAL APPLICATION FOR PAYMENT

A. The Contractor shall submit the final application for payment in accordance with the procedures and requirements stated in the General Conditions Title 20.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this section consists of maintaining a clean, orderly, hazard free worksite during construction, and final cleaning for the City's Final Acceptance. Failure to maintain the worksite will be grounds for withholding monthly payments until corrected to the satisfaction of the Project Manager and/or. the Project Inspector.
- B. Reference Contract General Conditions, GC 325, GC 803, GC 2001

1.02 JOB CONDITIONS

- A. Safety Requirements
 - Maintain the worksite in a neat, orderly and hazard-free manner in conformance with all federal, state and local rules, codes, regulations and orders, including all OSHA requirements, until Final Acceptance of the Work. Keep catwalks, underground structures, worksite walks, sidewalks, roadways and streets, along with public and private walkways adjacent to the worksite, free from hazards caused by construction activities. Inspect those facilities regularly for hazardous conditions caused by construction activities.
- B. Hazards Control
 - 1. Store volatile wastes in covered metal containers and remove those wastes from worksite daily.
 - 2. Do not accumulate wastes which create hazardous conditions.
 - 3. If volatile and noxious substances are being used in spaces that are not naturally ventilated, provide artificial ventilation.
 - 4. Hazard controls shall conform to the applicable federal, state and local rules and regulations.
 - 5. Provide appropriate waste receptacles in all areas in which employees are working. Waste receptacles shall be kept covered at all times. All materials on site shall be anchored and covered to prevent any objects from becoming wind-borne.
 - 6. Should an incident involving a spill or other encounter of a non-contained hazardous material occur on site, the Contractor shall immediately call 311 and ask to have Environmental Health notified of the event and also immediately notify the City Project Manager.
- C. Access
 - 1. Maintain the worksite to permit access by other City contractors as required and to allow access by emergency personnel.

1.03 SUBMITTALS

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS

- A. Utilize the type of cleaning materials recommended by the manufacturer for the surfaces to be cleaned.
- B. Maintain current Material Safety Data Sheets (MSDS) on site for all chemicals.
- C. Ensure proper disposal of all wastes generated from the use of these materials. Must ensure compliance with all environmental regulations.

PART 3 - EXECUTION

3.01 INTERIM CLEANING

- A. Clean the worksite every shift/workday for the duration of the construction contract. Maintain structures, grounds, storage areas and other areas of worksite, including public and private properties immediately adjacent to worksite, free from accumulations of waste materials caused by construction operations. Place waste materials in covered metal containers. All hard concrete, steel, wood and finished walking surfaces shall be swept clean daily.
- B. Remove or secure loose material on open decks and on other exposed surfaces at the end of each workday or more often in a manner that will maintain the worksite hazard free. Secure material in a manner that will prevent dislodgment by wind and other forces.
- C. Sprinkle waste materials with water or acceptable chemical palliative to prevent blowing of dust.
- D. Promptly empty waste containers when they become full and legally dispose of the contents at dumping areas off the City's property.
- E. Control the handling of waste materials. Do not permit materials to be dropped or thrown from structures.
- F. Immediately remove spillage of construction related materials from haul routes, work site, private property or public rights of way.
- G. Clean only when dust and other contaminants will not precipitate upon newly painted surfaces.
- H. Cleaning shall be done in accordance with manufacturer's recommendation.
- I. Cleaning shall be done in a manner and using such materials as to not damage the Work.
- J. Clean areas prior to painting or applying adhesive.
- K. Clean all heating and cooling systems prior to operations. If the contractor is allowed to use the heating and cooling system it shall be cleaned prior to testing.
- L. Clean all areas that will be concealed prior to concealment.

3.02 FINAL CLEANING

- A. Inspect interior and exterior surfaces, including concealed spaces, in preparation for completion and acceptance.
- B. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains and extraneous markings.

- C. Remove surplus materials, except those materials intended for maintenance.
- D. Remove all tools, appliances, equipment and temporary facilities used in the construction.
- E. Remove detachable labels and tags. File them with the manufacturer's specifications for that specific material for the City's records.
- F. Repair damaged materials to the specified finish or remove and replace.
- G. After all trades have completed their work and just before Final Acceptance, all catch basins, manholes, drains, strainers and filters shall be cleaned; roadway, driveways, floors, steps and walks shall be swept. Interior building areas shall be vacuum cleaned and mopped.
- H. Final cleanup applies to all areas within and adjacent to the site.

CONTRACT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of maintaining, marking, recording and submitting contract record documents which include shop drawings, warranties, contract documents and contractor records.
- B. Reference Contract General Conditions, GC 324

1.02 RELATED DOCUMENTS

- A. Technical Specifications Section 01 4000 "Contractor Quality Control"
- B. Technical Specifications Section 01 4200 "Quality Assurance"

1.03 SUBMITTALS

- A. Each submittal of record documents shall contain the following information:
 - 1. Date
 - 2. Project title, address and numbers
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Certification that each document as submitted is complete and accurate
 - 6. Signature of the Contractor or his authorized representative.
- B. At the completion of this contract, deliver all record documents including the following:
 - 1. As-built shop drawings, diagrams, illustrations, schedules, charts, brochures and other similar data
 - 2. Warranties, guarantees and bonds
 - 3. Contract documents
 - 4. Contractor records.

1.04 QUALITY CONTROL

PART 2 - RECORD DOCUMENTS SHALL BE PREPARED TO A HIGH STANDARD OF QUALITY

- PART 3 PRODUCTS (NOT USED)
- PART 4 EXECUTION

4.01 MAINTENANCE OF DOCUMENTS

A. The Contractor shall maintain at the worksite on a current basis one record copy of all drawings, specifications, addenda, change orders, approved shop drawings, working drawings, product data and samples in good order and marked currently to record all changes made during construction.

- B. Maintain at the field office one copy of the following record documents:
 - 1. Contract Documents
 - a. Contract drawings with all clarifications, requests for information, directives, changes and as-built conditions clearly posted.
 - b. Contract specifications with all clarifications, requests for information, changes, directives and record of manufacturer actually used along with product trade name..
 - c. One set of drawings to record the following:
 - 1) Horizontal and vertical location of underground utilities affected by the Work.
 - 2) Location of internal utilities; include valves, controls, conduit, duct work, switches, pressure reducers, size reducers, transitions, crosses, tees, filters, motors, heaters, dampers, regulators, safety devices, sensors, access doors and appurtenances that are concealed in the construction shall be shown with dimensions given from a visible and recognizable reference to the item being located in all three dimensions. The drawing shall also reference the applicable submittal for the item being located.
 - 3) Field changes of dimensions and details including as-built elevations and location (station and offset).
 - 4) Details not on original contract drawings but obtained through requests for information or by other communications with the City or Designer of Record.
 - 2. Contractor Records
 - a. Daily QC Reports
 - b. Certificates of compliance for materials used in construction
 - c. Nonconformance Reports (NCRs)
 - d. Remedial Action Requests (RARs)
 - e. Completed inspection list
 - f. Inspection and test reports
 - g. Test procedures
 - h. Approved submittals
 - i. Material and equipment storage records
 - j. Erosion, sediment, hazardous and quality plans
 - k. Hazardous material records
 - I. First report of injuries

4.02 RECORDING

- A. Keep record documents current daily.
- B. Legibly mark copies of the contract drawings to record actual construction.
- C. Legibly mark up each Section of the technical specifications and contract drawings to record:
 - 1. Changes made by change orders, requests for information, substitutions and variations approved by submittals.

4.03 DOCUMENT MAINTENANCE

- A. Maintain Documents in a clean, dry and legible condition, which shall be turned over to the City prior to final acceptance.
- B. Do not use record documents for construction purposes.

C. Make documents available for inspection by the Project Manager and any others having jurisdiction.

4.04 MONTHLY REVIEW

- A. The Project Manager or his designated representative can inspect the record documents to ensure that they are being maintained and contain the most current correct data with particular attention to as-built drawings.
- B. If, the Project Manager determines that the documents are not being maintained and kept current as to as-built conditions, an amount may be withheld from the payment request and deducted from the contract value to cover the City's cost of collecting and recording the asbuilt contract data. This cost will be determined on the basis of \$75.00 per man-hour of effort.

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work specified in this Section consists of preparing and submitting operation and maintenance data for mechanical, electrical and other specified equipment.

1.02 SUBMITTALS

- A. Refer to Technical Specifications Section 01 3000 and 01 3400 for submittal procedures.
- B. Submit one (1) electronic copy and two (2) bound hard copy of the proposed Operation and Maintenance Data Manual format including a table of contents not less than 30 days prior to acceptance tests and final inspection.
- C. Submit one (1) electronic copy and two (2) bound hard copy of Operation and Maintenance Data Manual prior to final payment These copies shall incorporate any comments made on the previous submittals, along with final readings on all settings and gauges taken while the system is in fully satisfactory operation, final test and balance reports, and final sequence of operations standards.

1.03 CONTINUOUS UPDATING PROGRAM

- A. Furnish one electronic copy of the Contractor's letter indicating that suppliers have been notified to provide updated operation and maintenance data, service bulletins and other information pertinent to the equipment, as it becomes available.
 - 1. Contractor to verify with Project Manager to which Facility Operator these notices are to be sent. All updates after Final Acceptance are to be sent to a Facility Operator with only a copy of the transmittal to the Project Manger.

PART 2 - PRODUCTS

- A. The following products are the requirements of hard copies:
- B. PAPER SIZE 8-1/2 inches x 11 inches.
- C. PAPER White bond, at least 20 pound weight.
- D. TEXT typewritten.
- E. PRINTED DATA Manufacturer's catalog cuts, brochures, operation and maintenance data. Clear reproductions thereof will be acceptable. If this data is in color, all final manuals must contain color data.
- F. DRAWINGS 8-1/2 inches x 11 inches, bound with the text. Larger drawings are acceptable provided they are folded to fit into a pocket inside the rear cover of the manual. Reinforce edges of large drawings.
- G. PRINTS OF DRAWINGS black ink on white paper, sharp in detail and suitable for making reproductions.

- H. FLYSHEETS Separate each portion of the manual with colored, neatly prepared flysheets briefly describing the contents of the ensuing portion.
- I. COVERS Provide 40 to 50 mil, clear plastic, front and plain back covers for each manual. The front covers shall contain the information required in paragraph 3.02 below.
- J. BINDINGS Conceal the binding mechanism inside the manual; lockable 3 ring binders shall be provided.

PART 3 - EXECUTION

3.01 COVER

- A. Include the following information on the front cover and on the inside cover sheet:
 - 1. OPERATION AND MAINTENANCE INSTRUCTIONS
 - 2. (TITLE OF STRUCTURE OR FACILITY AND ADDRESS)
 - 3. (TITLE AND NUMBER OF CONTRACT)
 - 4. (CONTRACTOR'S NAME AND ADDRESS)
 - 5. (GENERAL SUBJECT OF THE MANUAL)
 - 6. (Leave spaces for signatures of the City representatives and acceptance date)

3.02 CONTENTS OF THE MANUAL

- A. An index of all volumes in each volume of multiple volume systems.
- B. An index in front of each volume. List and combine the literature for each system in the sequence of operation.
- C. Name, address and telephone numbers of Contractor, suppliers and installers along with the manufacturer's order number and description of the order.
- D. Name, address and telephone numbers of manufacturer's nearest service representatives.
- E. Name, address and telephone number of nearest parts vendor and service agency.
- F. Copy of guaranties and warranties issued to, and executed in the name of, the City.
- G. Anticipated date City assumes responsibility for maintenance.
- H. Description of system and component parts including theory of operation.
- I. Pre operation check or inspection list.
- J. Procedures for starting, operating and stopping equipment.
- K. Post operation check or shutdown list.
- L. Inspection and adjustment procedures.
- M. Troubleshooting and fault isolation procedures for on-site level of repair.
- N. Emergency operating instructions.
- O. Accepted test data.
- P. Maintenance schedules and procedures.
- Q. Test procedures to verify the adequacy of repairs.
- R. One copy of each wiring diagram.
- S. One copy of each piping diagram.
- T. Location where all measurements are to be made.
- U. One copy of each duct diagram.
- V. One copy of control diagram.
- W. One copy of each accepted shop drawing.
- X. One copy of software programs imputable or changeable on site.
- Y. Manufacturer's parts list with catalog names, numbers and illustrations.
- Z. A list of components which are replaceable by the City.
- AA. An exploded view of each piece of the equipment with part designations.
- BB. List of manufacturer's recommended spare parts, current prices and recommended quantities for two years of operation.
- CC. List of special tools and test equipment required for the operation, maintenance, adjustment, testing and repair of the equipment, instruments and components.
- DD. Scale and corrosion control procedures.
- EE. Disassembly and re-assembly instructions.
- FF. Troubleshooting and repair instructions.
- GG. Calibration procedures.
- HH. Ordering information.
- II. Training course material used to train City staff, including DVD, slides and other presentation material.
- JJ. Inventory of all attic stock provided per the Technical Specifications and the specific location to which this was delivered.

SECTION 017320

CUTTING AND PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Cutting and patching includes cutting existing construction to provide for installation or performance of other Work, and subsequent fitting and patching required to restore surfaces to original conditions.
- C. Demolition of selected portions of the building for alterations is included in Technical Specification Section 017360, "Selective Demolition."

1.03 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a description of proposed procedures well in advance of the time cutting and patching will be performed and request approval to proceed from Project Manager and/or Designer. Include the following information, as applicable, in the proposal:
 - (1) Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - (2) Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - (3) List products to be used and firms or entities that will perform Work.
 - (4) List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - (5) Approval by the Project Manager and/or Designer to proceed with cutting and patching does not waive the Designer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.04 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 - (1) Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:

- (a) Foundation construction.
- (b) Bearing walls.
- (c) Wood beams.
- (2) Refer to General Contract Conditions Section 316 Cutting and Patching the Work.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
 - (1) Obtain approval from the Project Manager and/or Designer of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - (a) Primary operational systems and equipment.
 - (b) Water, moisture, or vapor barriers.
 - (c) Roofing and flashings.
 - (d) Control systems.
 - (e) Electrical wiring systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Designer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 EXECUTION

3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage.

- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - (1) Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
 - (1) In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Do not cut holes larger than necessary. Temporarily cover openings when not in use.
 - (2) To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - (3) Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
 - (4) Comply with requirements of applicable Technical Specification Sections of Division-2 where cutting and patching requires excavating and backfilling.
 - (5) By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Perform all patching with durable seams that are not discernable from normal viewing distances. Comply with specified tolerances.
 - (1) Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - (2) Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

SECTION 017360

SELECTIVE DEMOLITION

1.01 GENERAL

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Technical Specification Sections, apply to this Section.

1.03 SUMMARY

- A. This Section requires the selective removal and subsequent offsite disposal of the following:
 - (1) Portions of existing building indicated on drawings and as required to accommodate the restoration and rehabilitation of the building.
 - (2) Removal of items indicated "remove."
 - (3) Removal and protection of items indicated "remove," "salvage" or "relocate."
- B. Removal work specified elsewhere:
 - (1) Cutting and patching is specified in Technical Specification 017320.
- C. Related work specified elsewhere:
 - (1) Remodeling construction work and patching are included within the respective sections of specifications, including removal of materials for reuse and incorporation into remodeling.

1.04 SUBMITTALS

- A. Schedule indicating proposed sequence of operations for selective demolition work to Project Manager for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
- B. Photograph existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Project Manager prior to start of work.

1.05 JOB CONDITIONS

- A. Condition of Structures: City assumes no responsibility for actual condition of items to be removed.
 - (1) Conditions existing at time of inspection for bidding purposes will be maintained by City insofar as practicable. However, minor variations within structure may occur by City's removal and salvage operations prior to start of selective demolition work.

- B. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
 - (1) Storage or sale of removed items on site will not be permitted.
- C. Protections: Provide temporary barricades and other forms of protection to protect City's personnel and general public from injury due to selective demolition work.
 - (1) Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
 - (2) Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 - (3) Protect floors with suitable coverings when necessary.
 - (4) Construct temporary dustproof partitions where required to separate areas where extensive dirt or dust operations are performed.
 - (5) Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 - (6) Remove protections at completion of work.
- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- E. Flame Cutting: Do not use cutting torches without obtaining prior permission from the Project Manager and/or Designer.
 - (1) Where permission is granted, do not proceed until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- F. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
 - (1) Maintain fire protection services during selective demolition operations.
- G. Environmental Controls: Use necessary and appropriate methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to commencing with selective demolition work, inspect areas in which work will be performed. Photograph existing conditions of structure surfaces, equipment or surrounding

properties which could be misconstrued as damage resulting from selective demolition work; file with Designer prior to starting work.

3.02 PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
 - (1) Cover and protect City's property from soilage or damage when demolition work is performed in areas where such items have not been removed.
 - (2) Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 - (a) Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Project Manager if shutdown of service is necessary during changeover.

3.03 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
 - (1) Remove concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 - (2) Promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
 - (3) Provide services for effective dust control.
- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Designer in written, accurate detail. Pending receipt of directive from Designer, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site. Coordinate with City all building materials removed from the building for on-site disposal.
 - (1) If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution. Notify Project Manager and obtain specific direction regarding the suspected hazardous material from the City's Environmental Health Division.
 - (2) Burning of removed materials is not permitted on project site or elsewhere within the City and County of Denver.

3.05 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
 - (1) Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start of demolition operations. Repair and clean adjacent construction or surfaces soiled or damaged by selective demolition work.

SECTION 01 7400

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting warranties and bonds required by these specifications.
- B. Reference Contract General Conditions: GC 111, GC 1501, GC 1502, GC 1503, GC 1801, GC 1802.

1.02 SUBMITTALS

- A. Refer to Technical Specifications Section 01 3000 for submittal procedures.
- B. Submit executed warranties and bonds.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 WARRANTIES AND BONDS

- A. Execute the warranties and bonds required by the Contract Documents. Prepare and submit all bonds on the forms provided by the City. Deliver the executed warranties in electronic and hard copy format.
- B. Provide warranties or bonds for the materials, labor and time period set forth in the sections of these specifications requiring such documents. All warranties shall be in accordance with the Contract General Conditions. Refer to the Technical Specifications for all specific items requiring longer warranty periods.
- C. Provide all warranties and bonds that the manufacturer or supplier furnishes at no additional cost in regular commercial trade.

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements, if applicable:
 - 1. Division 02 Section "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
 - 2. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.03 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
 - 1. Demolition Waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Terra cotta/plaster walls.
 - e. Structural and miscellaneous steel.
 - f. Rough hardware.
 - g. Insulation.
 - h. Doors and frames.
 - i. Door hardware.
 - j. Windows.
 - k. Glazing.
 - I. Gypsum board.
 - m. Equipment.
 - n. Cabinets.
 - o. Piping.
 - p. Supports and hangers.
 - q. Valves.
 - r. Mechanical equipment.
 - s. Refrigerants.
 - t. Electrical conduit.
 - u. Copper wiring.
 - v. Lighting fixtures.
 - w. Lamps.
 - x. Ballasts.
 - y. Electrical devices.
 - 2. Construction Waste:
 - a. Lumber.
 - b. Wood sheet materials.
 - c. Metals.
 - d. Insulation.
 - e. Carpet.
 - f. Metal studs.
 - g. Gypsum board.
 - h. Piping.
 - i. Electrical conduit.
 - j. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.

- 6) Wood crates.
- 7) Plastic pails.

1.05 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

1.06 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. LEED Submittal: (Not applicable)
- H. Qualification Data: For refrigerant recovery technician.
- I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: General Contractor with a record of successful waste management coordination of projects with similar requirements.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
 1. Disposal Procedures:
 - a. Location: Denver Arapahoe Disposal Site DADS. All debris must be disposed of at this location.
 - b. Removal and Hauling: All Debris removal and hauling cost shall be part of base bid.
 - c. The Owner will set up an account with DADS that will cover the dump volumes cost only. All other fees to be included in base bid by General Contractor.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Technical Specification Section 012000 "Project Meetings." Meeting shall include contractors affected by the Waste Management Plan. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.08 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification. Include separate sections in plan to distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: (Not applicable)
- D. Cost/Revenue Analysis: (Not applicable)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. General Contractor's Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on appropriate separation, handling, and recycling to be used by all parties and proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Technical Specification Section 01500 "Temporary Facilities" for controlling dust and dirt, environmental protection, and noise control.
- E. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches or more.

3.02 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.

- C. Salvaged Items for Owner's Use: (Not applicable)
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- E. Lighting Fixtures: Separate lamps by type and protect from breakage.
- F. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Receivers and Processors: List below is <u>provided for information only</u>; available recycling receivers and processors include, but are not limited to, the following:

C.	RECYCLING RECI	EIVERS AN	ND PROCESSORS				
D.	CO Resource	F.	400 Marriel Avenue	H.	(970) 963- 8900	I.	George MacDonald
Ε.	Management	G.	Carbondale, CO 81623		0900		
J.	Oxford Recycling	K.	2400 W. Oxford Avenue	M.	(303) 762- 1160	N.	John Kent
		L.	Englewood, CO 80110		1100		
Ο.	Allied Waste	P.	10303 E. Dry Creek Rd #250	R.	(720) 895- 1500	S.	Bill Kich
		Q.	Englewood, CO 80112		1000		
T.	Waste-Not	U.	1065 Poplar Street	W.	(970 669- 9912	Х.	Gary Gettman
		V.	Loveland, CO 80534				
Y.	Bunting Disposal	Z.	3315 State Street	BB.	(970) 339- 3023	CC.	Bryan Bunting
		AA.	Evans, CO 80620				
DD.	Phoenix Recycling	EE.	2501 Delwood Avenue	GG.	(970) 375- 1300	HH.	Mark Thompson
		FF.	Durango, CO				

			81301		
Ш.	Waste Chasers	JJ. KK.	19 Oak Avenue Eaton, CO 80615	LL. (970) 454- 2497	MM. Jason Hawk
NN.	Colorado All Waste	00. PP.	7247 E. County Line Rd Longmont, CO 80504	QQ. (303) 702- 9955	RR. Majori McDonald
SS.	Patch Construction	TT. UU.	12655 State Hwy 67 Florence, CO 81226	VV. (719) 784- 6236	WW. David Patch Jr.
XX.	Pueblo Disposal	YY. ZZ.	28900 E. Hwy 96 Pueblo, CO 81001	AAA. (719) 948- 0047	BBB.
CCC.	Construction Endeavors	DDD. EEE.	2255 E. Las Vegas Rd Colorado Springs, CO	FFF. (303) 375- 0785	GGG.

- HHH. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- III. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch size.
- C. Masonry (Terra Cotta): Remove anchors and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 4-inch size.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 - 1. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- H. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.
 - 1. Comply with requirements in Division 32 Section "Plants" for use of chipped organic waste as organic mulch.
- C. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Division 32 Section "Plants." for use of clean sawdust as organic mulch.

- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.06 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.
- D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

SECTION 08 1700

INTEGRATED DOOR OPENING ASSEMBLIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Factory-assembled and factory-finished hollow metal doors and frames, including hardware for door opening assemblies.
- 1.02 RELATED REQUIREMENTS
 - A. Section 08 7100 Door Hardware: Additional hardware to be installed on these doors.
- 1.03 REFERENCE STANDARDS
 - A. ADA Standards Americans with Disabilities Act (ADA) Standards for Accessible Design.
 - B. ANSI/SDI A250.8 Specifications for Standard Steel Doors and Frames (SDI-100).
 - C. ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - D. BHMA A156.3 American National Standard for Exit Devices.
 - E. BHMA A156.15 American National Standard for Release Devices Closer Holder, Electromagnetic and Electromechanical.
 - F. BHMA A156.26 American National Standard for Continuous Hinges.
 - G. BHMA A156.32 American National Standard for Integrated Door Opening Assemblies.
 - H. ICC A117.1 Accessible and Usable Buildings and Facilities.
 - I. ITS (DIR) Directory of Listed Products.
 - J. NFPA 80 Standard for Fire Doors and Other Opening Protectives.
 - K. NFPA 252 Standard Methods of Fire Tests of Door Assemblies.
 - L. UL (DIR) Online Certifications Directory.
 - M. UL 10B Standard for Fire Tests of Door Assemblies.
 - N. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies.
- 1.04 ADMINISTRATIVE REQUIREMENTS
 - A. Coordination:
 - 1. Coordinate frame anchor placement with wall construction.
 - 2. Coordinate installation of electrical connections to electrical hardware items.

1.05 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Samples: Submit two samples of exposed door finish materials, in manufacturer's standard sizes, showing factory finishes and colors as selected.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- 1.06 QUALITY ASSURANCE
 - A. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units preassembled and prefinished, with door hardware mounted and functioning, and packaged to protect contents from damage.
- B. Store in a clean, dry, and ventilated space having controlled temperature and relative humidity between 30 and 60 percent and in accordance with manufacturer's written instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Adams Rite The Rite Door, an Assa Abloy Group company; RITE Door System: www.ritedoor.com.
 - 2. Syntegra Door Systems by Door Systems, Inc.; XT Series Exit Device Openings: www.doorsysinc.com/sle.
 - 3. Total Door Systems; Total Door System: www.totaldoor.com.
 - 4. Substitutions: See Section 01 6300 Substitutions.

2.02 ASSEMBLIES

- A. Door, Frame, and Hardware Assemblies: Provide fully functional, factory-assembled and factory-finished door opening units, complete with door, frame, and hardware; complying with BHMA A156.32 and specified requirements.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Provide additional hardware as specified in Section 08 7100.
- B. Applications:

2.03 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of local building code and authorities having jurisdiction, and the following:
 1. Force to Open Interior Swinging Egress Doors, Non-Fire Doors: Not more than 5 pounds.
 - 2. Force to Release Latch for Other Swinging Doors: Not more than 15 pounds to release latch, not more than 30 pounds to set door in motion, and not more than 15 pounds to swing door to full open position.
 - 3. Fire-Rated Doors: Comply with NFPA 80 and NFPA 252.
 - a. Hourly Fire-Rating: As indicated on Drawings.
 - 4. Door Assemblies in Rated Partitions: Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in other fire partitions having a fire-resistance rating of 30 minutes in accordance with fire protection assembly requirements shall be tested in accordance with NFPA 252, UL 10B, or UL 10C with the hose stream test.
 - Provide fire-rated units listed and labeled by UL (DIR), ITS (DIR), or _____.
 a. Attach fire rating label to each fire-rated unit in compliance with NFPA 80.

2.04 COMPONENTS

- A. Hollow Metal Doors: Doors complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A, Model 1 Full Flush; electrogalvanized prior to finishing; manufacturer's standard core and reinforcements.
 - 1. Door Thickness: 1-3/4 inches.
 - 2. Fire-Rated Doors: 16 gauge, 0.053 inch thick faces and edges.
- B. Hollow Metal Door Frames: Formed steel cased opening complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A; electrogalvanized prior to finishing.

2.05 DOOR HARDWARE

- A. Manufacturers: Door hardware manufacturers are as determined by manufacturer of Integrated Door Opening Assemblies in compliance with BHMA A156.32 requirements for applications indicated.
- B. Refer to Section 08 7100 for supplemental door hardware requirements.
- C. Continuous Hinges: Full height; complying with BHMA A156.26, Grade 1.

sDC Project No. 1902
Denver Central Library Renovations
GoBond 2018-043

- D. Flush Panic Exit Devices: Provide flush panel exit device, recessed into door; extruded aluminum, natural anodized finish; complying with BHMA A156.3, Grade 1.
 - 1. Projection From Face of Door: Maximum of 3/16 inch when door is open, minimum of 1-1/8 inch when closed.
 - 2. Face Insert: To match door finish.
 - Electromagnetic Door Holders: Complying with BHMA A156.15.
 - 1. Holding Force: 40 pound-force.
 - 2. Voltage: 12 VDC.

2.06 FINISHES

Ε.

- A. Doors and Frames:
 - 1. Primed Frames: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
 - 2. Primed Doors: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- 2.07 ACCESSORIES
 - A. Frame Spreader Bar: Provide for preassembled welded frames, unless otherwise indicated.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify existing conditions before starting this Work.
 - B. Verify that opening sizes and tolerances are acceptable.
- 3.02 INSTALLATION
 - A. Install doors in accordance with manufacturer's requirements and the specified performance requirements.
 - B. Touch up damaged factory finishes.
- 3.03 TOLERANCES
 - A. Clearances Between Door and Frame: As specified in ANSI/SDI A250.8.
 - B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.
- 3.04 ADJUSTING
 - A. Adjust for smooth and balanced door movement.

SECTION 08 4413

GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Aluminum-framed curtain wall framing system.
 - B. Anchorage and fastening systems.
 - C. Design engineering of framing system and load-bearing anchorage systems and connections to building structural frame.

1.02 REFERENCE STANDARDS

- A. AAMA CW-10 Care and Handling of Architectural Aluminum From Shop to Site.
- B. AAMA 503 Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems.
- C. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- D. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- E. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- F. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- G. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric].
- H. ASTM C661 Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
- I. ASTM C793 Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants.
- J. ASTM C794 Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
- K. ASTM C920 Standard Specification for Elastomeric Joint Sealants.
- L. ASTM C1087 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
- M. ASTM C1135 Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.
- N. ASTM C1184 Standard Specification for Structural Silicone Sealants.
- O. ASTM C1249 Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications.
- P. ASTM C1401 Standard Guide for Structural Sealant Glazing.
- Q. ASTM E122 Standard Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process.
- R. ASTM E783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate with installation of other components that comprise the exterior enclosure.
 - 2. Coordinate compatibility and design integrity to secure a weather and water tight seal with all systems, adjacent surfaces and related materials.
 - 3. Coordinate installation of firestopping at each floor slab edge.
 - 4. Coordinate and assume responsibility for compatibility and proper performance of sealants used as part of the work of this Section with sealants used by other trades that may be in direct contact with or adjacent to sealants used as part of the work of this Section.

1.04 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, and internal drainage details.
- C. Shop Drawings: Provide details of proposed structural sealant glazing (SSG) and weather sealant joints indicating dimensions, materials, bite, thicknesses, profile, and support framing.
- D. Shop Drawings: Indicate materials in place on building including coordination of related and adjoining work, insert drawings, and erection diagrams. Show relative layout for all adjacent walls, beams, columns slabs, ceilings, and similar items. Include elevations, floor plans, sections and full size details. Provide isometric details of any conditions, as requested by the Architect. Include the following information:
 - 1. Full size details, fully drawn, not outlined. Provide isometric details of any conditions, if requested by Architect.
 - 2. Joinery and internal weather seals.
 - 3. Glass and metal thicknesses, including tolerances.
 - 4. Glazing materials identification.
 - 5. Relative layout of walls, beams, columns and slabs with dimensions noted. Dimension all tolerances required or which can be accommodated.
 - 6. Field connections, weld sizes, anchorages and fasteners, embedment length and edge distances.
 - 7. Dimension limits of movements for all moving joints, and provisions for expansion and contraction.
 - 8. Spotting plans for preset inserts in structure or in adjacent construction.
 - 9. Perimeter sealant joint sizes, including tolerances and minimum/maximum joint sizes required.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Samples: Submit two samples of all materials included in the work of this Section, in size required to adequately illustrate material properties and characteristics. Include:
 - 1. Fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing, sealant details, profiles, and intersections.
- H. Structural Calculations: Provide structural calculations, sealed and signed by a professional engineer licensed in Colorado. Test reports are not an acceptable substitute for calculations. Include the following information:
 - 1. Analysis for applicable loads on framing members.
 - 2. Analysis for applicable loads on anchors, including anchors embedded in concrete.
 - 3. Section property computations for framing members.
 - 4. Analysis of structural silicone at structural glazing applications, identifying minimum required sealant bite and width required to transfer design loads from glass to framing.
- I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

- 1.05 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Indoor-emissions-restrictions.
 - 4. VOC-content-restrictions.
 - 5. Other specified sustainable design requirements identified as such in this Section.
 - C. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3): Option 2 Leadership Extraction Practices.
 - 1. Recycled Content:
 - a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at Colorado.
- B. Verify that each component is appropriate for use in structural sealant glazing (SSG) application in regards to at least the following properties; size, shape, dimensions, material, self-life, storage conditions, and color.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with not less than three years of documented experience.
 - 1. Engage single firm to assume sole responsibility for fabrication, installation, and coordination of all components of the work of this Section.
- D. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Handle and store products of this Section in accordance with AAMA CW-10.
 - B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.
- B. Take required precautions to properly isolate and prevent any degree of incompatibility between sealants, in strict accordance with sealant manufacturer's specifications, recommendations, and instructions.
- C. Periodically test sealants in place for adhesion using methods recommended by sealant manufacturer. Promptly replace sealants which do not adhere or fail to cure.
- 1.09 WARRANTY
 - A. See Section 01 7400 Warranties and Bonds, for additional warranty requirements.
 - B. Correct defective Work within a five year period after Date of Substantial Completion.

- C. Defective work is defined to include, but not be limited to, evidence of:
 - 1. Penetration of water into building.
 - 2. Air infiltration exceeding specified limits.
 - 3. Structural failure of components resulting from forces within specified limits.
 - 4. Delamination of laminated glass or failure of insulated glass units.
 - 5. Secondary glass damage or damage due to falling components.
 - 6. Adhesive or cohesive failure of sealants.
 - 7. Crazing on surface of non-structural sealants.
 - 8. Non-structural sealant hardening beyond Shore A durometer 50 or softening below 20.
 - 9. Failure to comply with specified performance requirements.
 - 10. Failure of operating parts to function normally and properly.
- D. Provide twenty year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, flaking, pitting, peeling, crazing, or non-uniformity of finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer:
 - 1. Kawneer North America; 1600 Wall System 2 SSG: www.kawneer.com/#sle.
 - 2. Substitutions: See Section 01 6300 Substitutions.
- B. Other Acceptable Manufacturers:
 - 1. Arcadia, Inc.: www.arcadiainc.com/#sle.
 - 2. Boyd Aluminum: www.boydaluminum.com/#sle.
 - 3. C.R. Laurence Company, Inc.; U.S. Aluminum: www.crl-arch.com/#sle.
 - 4. Oldcastle Building Envelope: www.oldcastlebe.com/#sle.
 - 5. Vitro America: www.vitroamerica.com.
 - 6. Wausau Window and Wall Systems: www.wausauwindow.com/#sle.
 - 7. YKK AP America. Inc.: www.ykkap.com.
 - 8. Substitutions: See Section 01 6300 Substitutions.
- 2.02 GENERAL PRODUCT REQUIREMENTS
 - A. General: Comply with source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
 - B. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.

2.03 CURTAIN WALL SYSTEM - GENERAL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Structural sealant glazing (SSG) adhesive on horizontal mullions; capped vertical mullions, unless otherwise indicated on Drawings.
 - 2. Fabrication Method: Shop/factory unitized system.
 - 3. Glazing Method: Field glazed system.
 - 4. Mullion Dimensions: Varies; refer to Drawings.
 - 5. Finish: Match existing.
 - a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

- 7. System Internal Drainage: Drain any water entering joints to the exterior by means of a weep drainage network; this includes condensation occurring in glazing channel and migrating moisture occurring within system.
 - a. Install pressure plates with weep holes located above glazing support flanges to properly allow water to weep to exterior through cover plates. Provide minimum of 2 weep holes in each exterior face cap section.
- 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 - 1. Design Wind Loads: Comply with the applicable code.
 - a. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - b. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.
 - 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 - 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
 - 4. Structural Sealant Glazing (SSG) System: For individual glass lites, design framing members to not exceed a deflection normal to the wall of L/175 between supports with 3/4 inch maximum, and a deflection parallel to the wall of L/360 with 1/8 inch maximum, whichever is less.
- C. Thermal Performance Requirements:
 - 1. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.

2.04 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Reinforced Mullions: As recommended by manufacturer using manufacturer's standard profile of extruded aluminum with internal reinforcement of steel shaped structural section.
- B. Glazing: As specified in Section 08 8000.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Anchorage and Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- C. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.
- D. Structural Sealant Glazing (SSG) Adhesive: Neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines, ASTM C1401.
 - 1. SSG adhesive in compliance with ASTM C920; Type S Single-component, Grade NS, Class 50, Use NT, G, and A.
 - 2. Ultimate Tensile Strength: Minimum of 50 psi as determined by test method ASTM C1135 under the following conditions.
 - a. Exposure to air temperatures of 190 degrees F and minus 20 degrees F.
 - b. Water immersion for seven (7) days, minimum.
 - c. Exposure to weathering for 5,000 hours, minimum.

- 3. Sealant Design Tensile Strength: 20 psi, maximum.
- 4. Hardness: 20 to 60 with Type A-2 durometer in compliance with test method ASTM C661.
- 5. SSG sealant tested for compatibility with glazing accessories in compliance with ASTM C1087, tested for accelerated weathering in compliance with ASTM C793, and in compliance with insulating glass secondary sealant design standards of ASTM C1249.
- E. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- F. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.
- Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
 Size gaskets as required by manufacturer of glazing channel frame to provide proper pressure and bite on glazing units.
- H. Glazing Accessories: As specified in Section 08 8000.

2.06 ACCESSORIES

- A. Reinforcement: Where fasteners screw-anchor into aluminum less than 1/8 inch thick, reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive, pressed-in splined grommet nuts.
- B. Brackets: High-strength aluminum brackets and reinforcements where possible; otherwise provide non-magnetic stainless steel or galvanized steel complying with ASTM A123/A123M.
- C. Inserts: Cast iron, malleable iron, or 12 gage galvanized steel for required anchorage to concrete or masonry.
- D. Expansion Anchors: Lead shield or toothed steel, drilled in type expansion bolts for required attachment to concrete or masonry.
- E. Bituminous Coatings: Cold-applied asphalt mastic, compounded for 30 mil thickness per coat.
- F. Shims: 100 percent nylon; high density.
- G. Internal System Sealants and Gaskets: As recommended by manufacturer for use within the framing system for fabrication, assembly, and installation. Use products which will remain permanently elastic, non-shrinking, and waterproof.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify dimensions, tolerances, and method of attachment with other related work.
 - B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
 - C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain wall wall systems in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill, head, and sill pan flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

- G. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
- H. Install internal system sealants as installation progresses. Seal end dam blocks and other components to ensure that proper water weepage paths are established and maintained within the system.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide field testing of installed curtain wall system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as directed by Architect.
 - 2. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf.
 - a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
 - 3. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
 - a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft.
- B. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

A. Adjust operating sash for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

SECTION 08 8000

GLAZING

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Insulating glass units.
 - B. Laminated glass.
 - C. Monolithic glass.
 - D. Plastic films.
 - E. Glazing compounds and accessories.
- 1.02 REFERENCE STANDARDS
 - A. 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
 - B. ANSI Z97.1 American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.
 - C. ASTM C864 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - D. ASTM C920 Standard Specification for Elastomeric Joint Sealants.
 - E. ASTM C1036 Standard Specification for Flat Glass.
 - F. ASTM C1048 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
 - G. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass.
 - H. ASTM C1193 Standard Guide for Use of Joint Sealants.
 - I. ASTM C1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
 - J. ASTM E1300 Standard Practice for Determining Load Resistance of Glass in Buildings.
 - K. ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.
 - L. GANA (GM) GANA Glazing Manual.
 - M. GANA (SM) GANA Sealant Manual.
 - N. NFRC 100 Procedure for Determining Fenestration Product U-factors.
 - O. NFRC 200 Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
 - P. NFRC 300 Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.
- 1.03 SUBMITTALS
 - A. See Section 01 3000 Submittals, for submittal procedures.
 - B. Product Data on Insulating Glass Unit Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
 - C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
 - D. Samples: Submit two samples 12 by 12 inch in size, showing coloration and design of each type of glass specified.
 - E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

- 1.04 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Material ingredients.
 - 4. Indoor-emissions-restrictions.
 - 5. VOC-content-restrictions.
 - 6. Other specified sustainable design requirements identified as such in this Section.
 - C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Option 1 Environmental Product Declaration (EPD):
 - a. Submit product data or other published information verifying that this product has an EPD. Submit in accordance with Section 01 8113, LEED Submittals – MRc2 - Building Product Disclosure and Optimization – Environmental Product Declarations.
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
 - D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Option 2 Leadership Extraction Practices Recycled Content:
 - a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
 - E. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
 - F. Low Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - b. Include information on USGBC's v4.1 Low Emitting Materials Calculator.
- 1.05 QUALITY ASSURANCE
 - A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.
 - B. Installer Qualifications: Company specializing in performing the work of this Section with minimum three years documented experience.
 - C. Provide each type of glass, primary sealant, and gasket from a single manufacturer with not less than five years documented experience in the production of required materials.
- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Comply with manufacturer's instructions for shipping, handling, storing, and protection of glass and glazing materials. Exercise exceptional care to prevent edge damage to glass, and damage to coatings.
 - B. Where insulating glass units will be exposed to substantial altitude changes during shipping, comply with manufacturer's recommendations for venting and sealing.
- 1.07 FIELD CONDITIONS
 - A. Do not install glazing when ambient temperature is less than 40 degrees F.
 - B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

- C. Install sealants only when ambient temperature conditions can be maintained at or above 40 degrees F during installation and 48 hours immediately following installation.
- 1.08 WARRANTY
 - A. See Section 01 7400 Warranties and Bonds, for additional warranty requirements.
 - B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
 - C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

- 2.01 GLAZING REQUIREMENTS GENERAL
 - A. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
 - B. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
 - C. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
 - D. Low-Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - 2. Ceilings, walls, thermal and acoustic insulation installed within the weather proofing system in this section must comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 018113 for specific VOC requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with applicable codes.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Design glazing units to reliably perform and remain reliably engaged on all edges under all service and thermal stresses, including those associated with partial shading.
 - 5. Limit center of glass deflection to the lesser of 3/4 inch or L/100 (where L is short side dimension of glass unit), or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 - 6. Assure and confirm compatibility of all materials in contact with each other.
 - 7. Glass thicknesses listed are minimum.
- B. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I Transparent Flat, Class 1 Clear, Quality Q3.
 - 2. Kind HS Heat-Strengthened Type: Complies with ASTM C1048.
 - 3. Kind FT Fully Tempered Type: Complies with ASTM C1048.
 - 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 5. Impact Resistant Safety Glass: Complies with ANSI Z97.1 Class B, or 16 CFR 1201 Category I criteria.
 - 6. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.
- 2.04 INSULATING GLASS UNIT APPLICATIONS
 - A. Acceptable Insulating Glass Unit Manufacturers:
 - 1. Fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
 - 2. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 - 3. Substitutions: Refer to Section 01 6300 Substitutions.
 - B. Insulating Glass Units: Types as indicated on Drawings.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
 - 4. Spacer Color: Black.
 - 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 - 6. Purge interpane space with dry air, hermetically sealed.
 - 7. Breather Tubes: Provide tubes from air space for insulating glass units without inert type gas that have a change of altitude greater than 2500 feet between point of fabrication and point of installation to permit pressure equalization of air space.
 - a. Breather Tubes: Seal breather tubes upon installation in accordance with insulating glass fabricator's requirements.
 - 8. Space between lites filled with air.
 - 9. Total Thickness: 1 inch.
 - C. Insulating Glass Units: Safety glazing.
 - 1. Applications:
 - a. Glazed lites in exterior doors.
 - b. Glazed sidelights and panels next to doors.
 - c. Locations required by applicable federal, state, and local codes and regulations.
 - d. Other locations specified or indicated on Drawings.
 - 2. Glass Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.

2.05 LAMINATED GLAZING UNITS

- A. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Complies with ANSI Z97.1 Class B or 16 CFR 1201 Category I impact test requirements.
 - 2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch thick, minimum.
 - 3. Interlayer Color/Pattern: Clear, no pattern.

- 4. Acceptable Manufacturers:
 - a. 3M Window Film: www.solutions.3m.com/#sle.
 - b. Flexvue Films: www.flexvuefilms.com/#sle.
 - c. Kuraray America, Inc.: www.kuraray.us.com/#sle.
 - d. Madico, Inc.: www.madico.com.
 - e. Substitutions: See Section 01 6300 Substitutions.

2.06 MONOLITHIC GLAZING UNITS

- A. General Combined Requirements: If a particular glass unit is indicated to comply with more than one type of requirement, such as color, safety characteristics, or other requirements. Comply with all specified requirements for each type as scheduled on Drawings.
- B. Monolithic Interior Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Fully tempered float glass.
 - 3. Tint: Clear.
 - 4. Thickness: As indicated on Drawings at each location and application.
 - 5. Glazing Method: Wet/dry glazing method, preformed tape and sealant.

2.07 PLASTIC FILMS

- A. Decorative Plastic Film: Vinyl ort polyester type.
 - 1. Application: Locations, colors and patterns as indicated on Drawings.
 - 2. Thickness Without Liner: 0.002 inch.
 - 3. Acceptable Manufacturers:
 - a. 3M Window Film; Fasara Decorative Window Film; www.3m.com.
 - b. Kuraray America, Inc.: www.kuraray.us.com/#sle.
 - c. Llumar, an Eastman Chemical Company; Decorative Window Film, Llumar: www.llumar.com/#sle.
 - d. Solyx Films LLC; 3M Fasara Decorative Window Film: www.solyxfilms.com.
 - e. Substitutions: Refer to Section 01 6300 Substitutions.
- B. Sound Control Film: Polyvinyl butyral (PVB) type.
 - 1. Application: Locations as indicated on drawings.
 - 2. Glass Type: Laminated safety glazing.
 - 3. Film Color: Clear.
 - 4. Thickness: 0.02 inch.
 - 5. Acceptable Manufacturer:
 - a. Kuraray America, Inc.; Trosifol Sound Control (SC): www.kuraray.us.com/#sle.
 - b. Substitutions: Refer to Section 01 6300 Substitutions.

2.08 GLAZING COMPOUNDS

- A. General Requirements:
 - 1. Provide black exposed glazing accessory materials, unless specifically indicated otherwise.
 - 2. Provide materials of hardness as recommended by manufacturer for required application and condition of installation in each case. Provide only compounds which are known to be fully compatible with surfaces contacted, including glass products, seals, and glazing channel surfaces.
- B. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; black color.

2.09 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 - 1. Width: As required for application.
 - 2. Thickness: As required for application.
 - 3. Spacer Rod Diameter: As required for application.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
 - 1. Size gaskets as required by manufacturer of glazing channel frame to provide proper pressure and bite on glazing units.

PART 3 EXECUTION

- 3.01 VERIFICATION OF CONDITIONS
 - A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
 - B. Verify that the minimum required face and edge clearances are being provided.
 - C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
 - D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.
- D. Sealed Insulating Glass Units: Seal breather tubes immediately prior to glass unit installation with bead of silicone sealant according to sealed insulating glass unit manufacturers requirements; do not crimp, bend, or otherwise damage breather tubes.

3.03 INSTALLATION - GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.
- 3.04 INSTALLATION DRY GLAZING METHOD (GASKET GLAZING)
 - A. Application Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
 - B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners; do not block weep paths.

- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- 3.05 INSTALLATION WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)
 - A. Application Exterior Glazed: Set glazing infills from the exterior of the building.
 - B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
 - C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
 - D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners; do not block weep paths.
 - E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
 - F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape flush with sight line.
 - G. Fill gap between glazing and stop with butyl type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
 - H. Apply cap bead of butyl type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- 3.06 INSTALLATION STRUCTURAL SILICONE GLAZING
 - A. Refer to Section 08 4413 for wall framing assembly requirements.
 - B. Application Field Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
 - 1. Four-Sided Structural: Glass with four sides structurally adhered to horizontal and vertical metal back-up mullion.
 - C. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
 - D. Provide only structural silicone sealant, tested and manufactured for structural glazing.
- 3.07 INSTALLATION PLASTIC FILM
 - A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
 - B. Place without air bubbles, creases or visible distortion.
 - C. Install film tight to perimeter of glass and carefully trim film with razor sharp knife. Provide 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required. Do not score the glass.
- 3.08 CLEANING
 - A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
 - B. Remove non-permanent labels immediately after glazing installation is complete.
 - C. Clean glass and adjacent surfaces after sealants are fully cured.
 - D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.
3.09 PROTECTION

A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Performance criteria for gypsum board assemblies.
 - 1. Acoustical assemblies.
 - 2. Fire-rated assemblies.
 - B. Metal stud wall framing.
 - C. Suspended metal ceiling framing.
 - D. Acoustic insulation and accessories.
 - E. Acoustical gypsum board ceiling system.
 - F. Mullion adapters.
 - G. Gypsum sheathing.
 - H. Gypsum wallboard.
 - I. Joint treatment and accessories.

1.02 REFERENCE STANDARDS

- A. AAMA 612 Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum.
- B. AISI S100-12 North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.
- C. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM C635/C635M Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- E. ASTM C645 Standard Specification for Nonstructural Steel Framing Members.
- F. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- H. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board.
- I. ASTM C954 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- J. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- K. ASTM C1047 Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
- L. ASTM C1177/C1177M Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- M. ASTM C1178/C1178M Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
- N. ASTM C1280 Standard Specification for Application of Gypsum Sheathing Board.
- O. ASTM C1396/C1396M Standard Specification for Gypsum Board.

- P. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- Q. ASTM E1264 Standard Classification for Acoustical Ceiling Products.
- R. ASTM E488/E488M Standard Test Methods for Strength of Anchors in Concrete Elements.
- S. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- T. ASTM E413 Classification for Rating Sound Insulation.
- U. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- V. GA-216 Application and Finishing of Gypsum Board.
- W. GA-600 Fire Resistance Design Manual.
- X. ICC (IBC) International Building Code.
- Y. UL (FRD) Fire Resistance Directory.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate with mechanical and electrical work. Do not attach or support metal framing to ducts, pipes, conduit, or similar items.
 - 2. Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.
 - 3. Coordinate with installation of sprayed-on fireproofing to minimize or eliminate damage to that work due to gypsum board systems installation.
 - 4. Coordinate gypsum board work with requirements of Section 07 8400 to maintain integrity of fire-rated and smoke-rated partitions required to comply with specified regulatory requirements.

1.04 SUBMITTALS

- A. See Section 01 3000 Submittals for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
 1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- 1.05 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Recycled content.
 - 2. Source location.
 - 3. Other specified sustainable design requirements identified as such in this Section.
 - C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Option 1 Environmental Product Declaration (EPD):
 - a. Submit product data or other published information verifying that this product has an EPD. Submit in accordance with Section 01 8113, LEED Submittals MRc2 Building Product Disclosure and Optimization Environmental Product Declarations.
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.

- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Option 2 Leadership Extraction Practices Recucled Content:
 - a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- E. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Option 2 Leadership Extraction Practices Extended Producer Responsibility:
 - a. Submit product data or other published information indicating that product manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility.
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- F. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - Option 1 Material Ingredient Reporting:
 - Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm): Manufacturer inventory of all ingredients or Health Product Declaration, Declare, Living Product Challenge, Cradle to Cradle v2 Basic or v3 Bronze, Product Lens Certification, Facts NSF/ANSI 336, ANSI/BIFMA e3 Furniture Sustainability Standard; or other USGBC approved program, if applicable.
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- G. "Low Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - b. Include information on USGBC's v4.1 Low Emitting Materials Calculator.
- 1.06 QUALITY ASSURANCE

1.

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum three years of documented experience.
- B. Stud Framing: Products that do not comply with ASTM C645 or ASTM C754 are not permitted.
- C. Basis of Design: Specifications are based on certain gypsum board products by specified basis of design standard manufacturers. Gypsum board products manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, appearance, and performance are minor, and do not detract substantially from the indicated design intent.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Store and protect products in accordance with referenced standards.
 - B. Handle gypsum boards to prevent damage to ends, edges, and surfaces.
- 1.08 FIELD CONDITIONS
 - A. Maintain ambient temperatures at not less than 40 degrees F for non-adhesive attachment of gypsum board, and not less than 50 degrees F for adhesive attachment.
 - B. Maintain ambient temperatures at not less than 50 degrees F for a period 48 hours before gypsum board finishing, during installation, and after installation of board materials.

PART 2 PRODUCTS

- 2.01 GYPSUM BOARD ASSEMBLIES
 - A. Provide completed assemblies complying with ASTM C840 and GA-216 as applicable.

- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 1. Acoustic Attenuation: STC as indicated on Drawings, calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies as specified on Drawings.
 - 1. ICC (IBC) Item Numbers: Comply with applicable requirements of ICC (IBC) for the particular assembly.
 - 2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
 - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
 - 4. Where any specified rated assembly requires the use of proprietary gypsum board system products, installation methods or procedures, comply with specified rated assembly requirements including requirements associated with assembly options which may be selected by Contractor.
- D. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- E. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- F. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- G. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- H. Low-Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Ceilings, walls, thermal and acoustic insulation installed within the weather proofing system in this section must comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 01 8113 for specific VOC requirements.
- 2.02 METAL FRAMING MATERIALS
- A. Acceptable Manufacturers:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. Jaimes Industries: www.jaimesind.com/#sle.
 - 3. CEMCO; California Expanded Metal Company: www.cemcosteel.com.
 - 4. Marino: www.marinoware.com.
 - 5. R-stud, LLC: www.rstud.com/#sle.
 - 6. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
 - 7. SCAFCO Corporation: www.scafco.com/#sle.
 - 8. Steel Construction Systems: www.steelconsystems.com/#sle.
 - 9. Substitutions: See Section 01 6300 Substitutions.
 - B. Metal Framing General: Provide framing materials complying with specified standards and tested assemblies; galvanized sheet steel, 25 gage unless specified, noted, scheduled, or detailed otherwise.
 - 1. Use minimum 20 gage studs at door jambs, tile backing support, and other locations indicated on Drawings.
 - 2. Comply with recycled content product requirements specified in Section 01 8113 Sustainable Design Requirements.
 - a. Recycled Content: Minimum 3 percent recycled content if purchasing from Colorado.
 - b. Recycled Content: Minimum 95 percent recycled content, if purchasing outside of Colorado.

- C. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
 - 1. Framing System Components Supporting Tiling and Similar Wall Finishes: Maximum deflection of wall framing of L/360 at 5 psf, unless otherwise permitted by governing standard for wall finish.
 - 2. Studs: "C" shaped with ribbed webs, and flanges with rolled edge stiffeners.
 - 3. Runners: U shaped, sized to match studs.
 - 4. Other Stud System Accessories: Manufacturer's standard clips, shoes, ties, reinforcements, fasteners, and other accessories as required for a complete stud framing system.
 - a. Stud Fasteners: Comply with ASTM C1513; size and length to suit connecting requirements.
 - 5. Ceiling Channels: C-shaped.
 - 6. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
- D. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754.
- E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
 - 3. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on Drawings; minimum track length of 12 feet.
- F. Non-Structural Framing Accessories:
 - 1. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
- 2.03 ACOUSTICAL CEILING SYSTEM
 - A. Acoustical Gypsum Board Ceiling System: Seamless gypsum board ceiling system with acoustical performance characteristics, including suspension system, backer panels, facer panels and spray-applied finish to produce non-directional monolithic ceiling system with fine finish texture.
 - Direct Hung Grid Suspension System: System manufacturer's standard components specifically designed for acoustical performance with specified ceiling system, complying with ASTM C635/C635M; direct-hung system composed of main runners and cross-furring runners that interlock; size hanger wires for three times imposed loads, as determined by ASTM E488/E488M; corrosive resistant materials.
 - 2. Backer Panels: Manufacturer's proprietary 1 inch thick high-NRC base mat panels and end-joint backer panels.
 - 3. Facer Panels: Manufacturer's proprietary 5/8 inch thick perforated gypsum board panels.
 - 4. Finishing Accessories: Manufacturer's proprietary joint tape and compound, and finish system materials to produce monolithic appearance.
 - a. Color: As selected by Architect from manufacturer's full line.
 - 5. Other System Components: Edge profiles and other components as indicated on Drawings; provided by system manufacturer.
 - 6. Light Reflectance: 87 percent, determined in accordance with ASTM E1264.
 - 7. NRC Range: 0.65 to 0.75, determined in accordance with ASTM E1264.
 - 8. Ceiling Attenuation Class (CAC): 48, determined in accordance with ASTM E1264.
 - 9. Acceptable System:
 - a. Armstrong Ceiling and Wall Solutions; Acoustibuilt Seamless Acoustical Ceiling System: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6300 Substitutions.
- 2.04 BOARD MATERIALS
 - A. Acceptable Manufacturers Gypsum-Based Board:
 - 1. American Gypsum Company: www.americangypsum.com/#sle.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.

- 3. Continental Building Products: www.continental-bp.com/#sle.
- 4. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
- 5. National Gypsum Company: www.nationalgypsum.com/#sle.
- 6. PABCO Gypsum: www.pabcogypsum.com/#sle.
- 7. USG Corporation: www.usg.com/#sle.
- 8. Substitutions: See Section 01 6300 Substitutions.
- B. Board Materials General:
 - 1. Comply with recycled content and source location product requirements specified in Section 01 8113 -Sustainable Design Requirements.
 - a. Recycled Content: Minimum 3 percent recycled content if purchasing from Colorado.
 - b. Recycled Content: Minimum 95 percent recycled content, if purchasing outside of Colorado.
- C. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Applications: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - 3. Thickness: As indicated on Drawings.
- D. Backing Board For Wet Areas:
 - 1. Applications: Surfaces behind tile in wet areas including toilet rooms.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Glass-Mat-Faced Backing Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Standard Type Thickness: 5/8 inch.
 - b. Acceptable Products:
 - 1) CertainTeed Corporation; Diamondback Tile Backer: www.certainteed.com/#sle.
 - 2) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
 - 3) National Gypsum Company; Gold Bond eXP Tile Backer: www.nationalgypsum.com/#sle.
 - 4) Substitutions: See Section 01 6300 Substitutions.
- E. Water-Resistant Gypsum Board: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
 - 1. Applications: Ceilings and vertical surfaces in "wet" areas but not behind thinset tile.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness: As indicated on Drawings.
 - 5. Acceptable Products:
 - a. American Gypsum Company; M-Bloc: www.americangypsum.com/#sle.
 - b. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
 - c. Substitutions: See Section 01 6300 Substitutions.
- F. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 - 1. Applications: Exterior sheathing, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 - 4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 - 5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 6. Thickness: As indicated on Drawings.
- 2.05 ACOUSTICAL ACCESSORIES
 - A. Resilient Furring Channels: ASTM C645 galvanized steel sheet, 25 gage thickness; 1/2 inch depth, for attachment to substrate through one leg only.
 - B. Acoustic Insulation General: Use type of acoustical insulation to comply with indicated assembly requirements.

09 2116 - 6 GYPSUM BOARD ASSEMBLIES

- C. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
 - 1. Thickness: Full thickness of indicated wall framing.
- D. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- 2.06 INSTALLATION AND FINISHING ACCESSORIES
 - A. Mullion Adaptors: Extruded aluminum partition closure, pre-assembled and spring-loaded to provide tight fit for vertical junctures of gypsum board partitions and aluminum storefront frames.
 - 1. Color and Finish: Match finish specified for aluminum framing to which it is attached.
 - 2. Basis of Design Product:
 - a. Gordon Interior Specialties, division of Gordon, Inc.; Mullion Mate Series: www.gordoninteriors.com.
 - b. Substitutions: See Section 01 6300 Substitutions.
 - B. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rigid plastic, unless noted otherwise.
 - 1. Special Shapes: In addition to conventional corner bead and control joints, provide L-bead at exposed panel edges.
 - C. Special Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
 - 1. Control Joints: One-piece, v-grooved control joint with integral perforated flanges; removable tape to protect v-groove during finishing.
 - a. Applications: Locations specifically noted on Drawings; also located at internal corners, wall locations at re-entrant soffit corners, and ceiling locations at re-entrant soffit corners whether or not specifically noted on Drawings.
 - 2. Decorative Trim Accessories: Aluminum reveal and other solid profile extrusions; configurations as indicated on Drawings; depth as required for secure anchoring to substrates before application of finish gypsum board panels, and to produce indicated ; integral perforated mounting flanges.
 - a. Include required intersection, mitered corner, and termination trim accessories.
 - b. Natural Anodized Finish with Organic Seal: AAMA 612 Clear anodic coating with non-aqueous electro-deposited organic seal; not less 0.7 mils thick.
 - c. Basis of Design Manufacturer:
 - 1) Fry Reglet Corp.: www.fryreglet.com.
 - 2) Substitutions: See Section 01 6300 Substitutions.
 - d. Other Acceptable Manufacturers:
 - 1) Gordon Interior Specialties, division of Gordon, Inc.: www.gordoninteriors.com.
 - 2) MM Systems Corporation: www.mmsystemscorp.com.
 - 3) Phillips Manufacturing Co.: www.phillipsmfg.com/#sle.
 - 4) Pittcon Industries: www.pittconindustries.com.
 - 5) Substitutions: See Section 01 6300 Substitutions.
 - D. Joint Materials: ASTM C475/C475M, and as recommended by gypsum board manufacturer for project conditions.
 - 1. Sheathing Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Interior Gypsum Board Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated or specified for proprietary finishing systems.
 - 3. Joint Compound for Proprietary Acoustical Ceiling Systems: As required by ceiling system manufacturer; no exceptions.
 - 4. Joint Compound for Wet and Exterior Locations: Chemical quick-setting type for first 2 coats, and vinyl type top coat specially formulated for finishing topping.
 - E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
 - F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
 - G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify that project conditions are appropriate for work of this Section before commencing work of this Section.
- 3.02 PREPARATION
 - A. Provide wall layout on floor surfaces for review by Architect before commencing stud wall framing.
 - 1. Layout walls in contiguous areas on each floor and in each building wing or section, as directed by Architect.
 - 2. Commencent of stud wall framing prior to receipt of approval of layout from Architect is assumed at Contractor's sole risk if wall layout is required to change for any reason.
- 3.03 SHAFT WALL INSTALLATION
 - A. Shaft Wall Framing: Install in accordance with GA-600 requirements.
 - B. Shaft Wall Coreboard: Cut panels to accurate dimensions and install sequentially between special friction studs.
 - C. Seal perimeter of shaftwall work where it abuts other work following requirements of Section 07 8400 -Firestopping for firestopping and fire-resistive joint sealant as applicable. Use exposed acoustic sealant at joints exposed to view on finished side.
- 3.04 FRAMING INSTALLATION
 - A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
 - B. Suspended Ceilings and Soffits:
 - 1. Level ceiling and soffit system to a tolerance of 1/600.
 - 2. Laterally brace entire suspension system.
 - 3. Space ceiling framing and furring members 16 inches on center, except as otherwise specified.
 - 4. Space ceiling framing and furring members at water-resistant gypsum board locations not to exceed 12 inches on center.
 - 5. Acoustical Ceiling System Installation:
 - a. Install acoustical ceiling system in accordance with manufacturer's printed installation instructions. Include all system components and accessories for complete and acoustically functional installation as specified.
 - C. Stud Framing: Space studs as permitted by standard or as specified below.
 - 1. Space studs 16 inches on center, except as otherwise indicated or required by specified tested assemblies, and secure to floor and ceiling runners with screws.
 - 2. Provide supplemental framing matching primary wall framing to support cut edges of gypsum boards not supported by primary vertical wall framing members.
 - 3. Extend partition framing to structure in all locations, unless otherwise indicated on Drawings.
 - 4. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
 - 5. Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support free from axial loading. Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from plane of faces of adjacent framing.
 - D. Framing Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
 - 1. Access Doors: Coordinate placement of openings for access doors and hatches with Architect before framing opening. Avoid placing openings at highly visible locations on wall and ceilings. Refer to Section 08 3100.

- E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
- F. Blocking: Install wood blocking for support of the following items; see Section 06 1053 for additional requirements:
 - 1. Framed openings.
 - 2. Wall-mounted cabinets.
 - 3. Plumbing fixtures.
 - 4. Toilet partitions.
 - 5. Toilet accessories.
 - 6. Wall-mounted door hardware.
 - 7. Similar items indicated on Drawings.

3.05 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustical Furring: Install resilient channels to framing at maximum 24 inches on center. Locate gypsum board joints only over resilient channel members.
 - 1. Install with open leg facing up.
 - 2. Do not screw through gypsum board and resilient channel to wall stud; use screws that are only long enough to engage gypsum board and resilient channel.
- B. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- C. Acoustic Sealant: Install as follows:
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.06 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
 - 1. Space fasteners in accordance with ASTM C840 and manufacturer's recommendations.
 - 2. Install interior wall and partition boards in accordance with requirements of referenced installation standards, except where fire or sound rating requires a particular direction; comply with the method stated in the tested assembly data.
 - 3. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- B. Single-Layer Non-Rated Applications: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
 - 1. Limit annular space between gypsum wall board edges and electrical device boxes to maximum 1/8 inch, or as limited by applicable Code.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- E. Exterior Sheathing Board Applications: Comply with ASTM C1280. Install sheathing horizontally, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.
- F. Installation on Metal Framing: Use screws for attachment of gypsum board.
- G. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
 - 1. Single-Layer Applications: Screw attachment.
 - 2. Double-Layer Applications: Install base layer using screws. Install face layer using screws.

- 3.07 INSTALLATION OF TRIM AND ACCESSORIES
 - A. Control Joints: Place control joints consistent with lines of building spaces as indicated on Drawings; if not specifically indicated, provide control joints as follows:
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - B. Corner Beads: Install at external corners, using longest practical lengths.
 - C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
 - D. Decorative and Special Trim: Install at locations shown on Drawings and in accordance with manufacturer's instructions.

3.08 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Acoustical Ceiling System: Use proprietary joint treatment system required by manufacturer; no exceptions.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated or specified.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated or specified.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 - 3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Suspended metal grid ceiling system.
 - B. Acoustical units.
 - C. Supplementary acoustical insulation above ceiling.

1.02 REFERENCE STANDARDS

- A. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM C635/C635M Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C. ASTM C636/C636M Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- D. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- E. ASTM E1264 Standard Classification for Acoustical Ceiling Products.
- 1.03 ADMINISTRATIVE REQUIREMENTS
 - A. Coordination: Coordinate the location of hangers with other work.
 - B. Sequencing: Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
 - 1. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two samples minimum 6 by 6 inch in size illustrating material and finish of acoustical units.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Acoustical Units: 80 sq ft of each type and size.

1.05 SUSTAINABLE DESIGN SUBMITTALS

- A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
- B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Sustainably harvested wood, which is defined as certified by FSC or three other organizations.
 - 2. Source location.
 - 3. Environmental product declarations (EPD).

- 4. Indoor-emissions-restrictions.
- 5. VOC-content-restrictions.
- 6. Other specified sustainable design requirements identified as such in this Section.
- C. Low Emitting Materials (EQc2): Ceilings, walls, thermal and acoustic insulation.
 - 1. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 2. Include information on USGBC's v4.1 Low Emitting Materials Calculator.
- 1.06 QUALITY ASSURANCE
 - A. System Installer Qualifications: Company specializing in the installation of products specified in this Section with minimum three years documented experience.
 - B. Basis of Design: Specifications are based on ceiling types by specified basis of design manufacturer and product(s). Ceiling types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, performance, and profile are minor, and do not detract substantially from the indicated design intent.
- 1.07 MOCK-UP
 - A. Mock-up: Construct in-place mock-ups, minimum 10 feet long by 10 feet wide, illustrating complete installation of each ceiling system specified.
 - 1. Locate where directed.
 - 2. Mock-up may remain as part of the Work.
- 1.08 FIELD CONDITIONS
 - A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 20 to 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Acceptable Manufacturers Acoustic Panels:
 - 1. Manufacturers and ceiling panel products specified on Drawings.
 - 2. Substitutions: See Section 01 6300 Substitutions.
 - a. Acceptability of substituted items may be determined solely on the basis of design, appearance or finish.
 - B. Acceptable Manufacturers Suspension Systems:
 - 1. Same as for acoustical units.
 - 2. Substitutions: See Section 01 6300 Substitutions.
- 2.02 ACOUSTICAL CEILINGS
 - A. Acoustical Units General: ASTM E1264, Class A.
- 2.03 GENERAL PRODUCT REQUIREMENTS
 - A. General: Comply with sustainably harvested wood, source location, and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
 - B. Low-Emitting Materials (EQc2): Ceilings, walls, and acoustic insulation.
 - 1. Ceilings, walls, thermal and acoustic insulation installed within the weather proofing system in this section must comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
 - C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.

- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- E. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- F. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- G. Low-Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Ceilings, walls, thermal and acoustic insulation installed within the weather proofing system in this section must comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 01 8113 for specific VOC requirements.
- 2.04 SUSPENSION SYSTEMS
 - A. Metal Suspension Systems General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
 - 1. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
 - 2. Finish: Manufacturer's standard, unless otherwise specified for grid type and location.
 - B. Exposed Suspension System: Hot-dipped galvanized steel grid and cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch or 9/16 inch face width as required for each ceiling panel product.
 - 3. Finish: Baked enamel.
 - 4. Color: White, unless otherwise specified on Drawings.
- 2.05 ACCESSORIES
 - A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
 - B. Hanger Wire: Minimum 12 gauge, 0.08 inch galvanized steel wire.
 - C. Hold-Down Clips: Manufacturer's standard clips to suit application.
 - D. Perimeter Trim Profiles: Same material and finish as grid.
 - 1. Size: As required for installation conditions.
 - 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 - 3. Shadow Molding: Shaped to create a perimeter reveal.
 - E. Acoustical Insulation: ASTM C665, friction fit type, unfaced batts.
 - 1. Thickness: 3-1/2 inches.
 - 2. Size: To fit acoustical suspension system.
 - F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify existing conditions before starting work.
 - B. Verify that layout of hangers will not interfere with other work.
- 3.02 PREPARATION
 - A. Install after major above-ceiling work is complete.

- 3.03 INSTALLATION SUSPENSION SYSTEM
 - A. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.
 - B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
 - C. Locate system on room axis according to reflected plan.
 - D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.
 - E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
 - G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
 - H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
 - 1. Support all fixtures weighing less than 56 lb by at least two supplementary No. 12 gage hangers if required by applicable building code; hangers may be slack.
 - I. Do not eccentrically load system or induce rotation of runners.
- 3.04 INSTALLATION ACOUSTICAL UNITS
 - A. Install acoustical units in accordance with manufacturer's instructions.
 - B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
 - C. Lay directional patterned units with pattern parallel to shortest room axis, unless otherwise indicated or directed.
 - D. Fit border trim neatly against abutting surfaces.
 - E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
 - F. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges; finish cut edges to match factory finished edges if cut edge is exposed to view.
 - G. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions.
 - H. Install hold-down clips on panels within 20 ft of an exterior door.
- 3.05 TOLERANCES
 - A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
 - B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

RESILIENT FLOORING AND BASE

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Resilient flooring, including LVT flooring.
 - B. Resilient stair accessories.
 - C. Flooring system accessories.
- 1.02 ADMINISTRATIVE REQUIREMENTS
 - A. Sequencing:
 - 1. Install resilient flooring and accessories after other finishing operations, including painting have been completed.
 - 2. Do not install resilient flooring over concrete slabs until slabs have been fully cured, and are sufficiently dry to achieve proper bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.
- 1.03 REFERENCE STANDARDS
 - A. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - B. ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - C. ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- 1.04 SUBMITTALS
 - A. See Section 01 3000 Submittals, for submittal procedures.
 - B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
 - C. Shop Drawings: Indicate seaming plans, floor patterns, and transition details for all specified flooring types.
 - D. Verification Samples: Submit two samples, minimum 12 x 12 inch in size illustrating color and pattern for each resilient flooring product specified.
 - E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
 - F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
 - G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Flooring Material: 50 square feet of each type and color.
 - 2. Extra Wall Base: 24 linear feet of each type and color.
 - 3. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.
 - 4. Clearly identify each package.
- 1.05 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Recycled content.
 - 2. Source location.
 - 3. Environmental product declarations (EPD).
 - 4. Material ingredients.

- 5. Indoor-emissions-restrictions.
- 6. VOC-content-restrictions.
- 7. Other specified sustainable design requirements identified as such in this Section.
- C. Low Emitting Materials (EQc2): Flooring.
 - Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 2. Submit product data or other published information verifying that hard surface flooring meets testing and product requirements of FloorScore. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base.
 - 3. Submit product data or other published information verifying that tile setting adhesives and grouts meet the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 4. Include information on USGBC's v4.1 Low Emitting Materials Calculator.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Deliver and store materials in manufacturer's original unopened containers, with brand names and production lot numbers clearly marked.
- C. Store all materials off of the floor in an acclimatized, weather-tight space until ready for installation. Maintain storage space within lower and upper temperature and humidity limits required by flooring manufacturer
- D. Store materials for not less than 48 hours prior to installation in area of installation at a minimum temperature of 65 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F and not exceeding 85 degrees F, unless otherwise restricted by flooring manufacturer. Maintain temperature and relative humidity at the same levels during installation, and after installation.
 - 1. Protect roll materials from damage by storing on end.
 - 2. Do not double stack pallets.

1.08 WARRANTY

- A. See Section 01 7400 Warranties and Bonds, for additional warranty requirements.
- B. Resilient Flooring: Provide manufacturer's warranty, as follows:
 - 1. Materials: Minimum 2 years from date of purchase.
 - 2. Installation: Minimum 2 years from date of installation; warrant entire installation against loss of adhesion to substrates.

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Acceptable Manufacturers:
 - 1. Manufacturers and products specified on Drawings.
 - 2. Substitutions: Not permitted.
- 2.02 GENERAL PRODUCT REQUIREMENTS
 - A. General: Comply with material ingredient, recycled content, source location, and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.

- B. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- C. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- E. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- F. Low-Emitting Materials (EQc2):
 - 1. Adhesives & Sealants:
 - a. Adhesives and Sealants applied on site within the weather proofing system in this section must comply with South Coast Air Quality Management District Rule 1168 effective October 6, 2017 for VOC content. Products must also comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 01 8113 for specific VOC requirements.
- 2.03 ACCESSORIES
 - A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
 - B. Adhesives: Waterproof; types recommended by flooring manufacturer.
 1. VOC Content and Emission Limits: As specified in Section 01 8113.
 - C. Moldings and Edge Strips: Homogeneous vinyl or rubber type; profiles as indicated on Drawings; color selected by Architect.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
 - B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
 - C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
 - D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.

- D. Clean substrate.
- 3.03 INSTALLATION GENERAL
 - A. Starting installation constitutes acceptance of subfloor conditions.
 - B. Install in accordance with manufacturer's written instructions.
 - C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
 - D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
 - E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
 - G. At movable partitions, install flooring under partitions without interrupting floor pattern.
- 3.04 INSTALLATION SHEET FLOORING
 - A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
 - B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
 - C. Cut sheet at seams in accordance with manufacturer's instructions.
 - D. Seal seams by heat welding where indicated or required by manufacturer for applicable flooring products.
 - E. Chemically bond seams using seam sealer where indicated or required by manufacturer for applicable flooring products.
- 3.05 INSTALLATION TILE AND PLANK FLOORING
 - A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
 - B. Lay flooring in direction as noted on floor finish plans on Drawings.
 - C. Install plank tile with a random offset of at least 6 inches from adjacent rows.
- 3.06 INSTALLATION STAIR COVERINGS
 - A. Install stair coverings in one piece for full width and depth of tread.
 - B. Install stringers configured tightly to stair profile.
 - C. Adhere over entire surface. Fit accurately and securely.
- 3.07 CLEANING
 - A. Remove excess adhesive from floor, base, and wall surfaces without damage.
 - B. Clean in accordance with manufacturer's written instructions.
- 3.08 PROTECTION
 - A. Prohibit traffic on resilient flooring for 48 hours after installation.
 - B. Protect flooring from accumulation of construction debris; cover after observation of installation by Architect.

TILE CARPETING

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Carpet tile, spot-adhered.
- 1.02 REFERENCE STANDARDS
 - A. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - B. ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - C. ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - D. CRI 104 Standard for Installation of Commercial Carpet.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.
- 1.04 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Recycled content.
 - 2. Source location.
 - 3. Environmental product declarations (EPD).
 - 4. Material ingredients.
 - 5. Indoor-emissions-restrictions.
 - 6. VOC-content-restrictions.
 - 7. Other specified sustainable design requirements identified as such in this Section.
 - C. Low Emitting Materials (EQc2): Flooring.
 - Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 2. Submit product data or other published information verifying the carpet meets the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program, the carpet cushion meets the testing and product requirements of the Carpet and Rug Institute's Green Label program, and that the VOC (Volatile Organic Compound) content of carpet adhesive is less than or equal to governing standards.
 - 3. Include information on USGBC's v4.1 Low Emitting Materials Calculator.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience.
- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver carpeting materials in original mill protective wrapping, with mill register numbers and tags attached.
 - B. Store inside, in well ventilated area, protected from weather, moisture, and soiling.
- 1.07 FIELD CONDITIONS
 - A. Stage materials in area of installation for minimum period of 24 hours prior to installation.
 - B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.
 - C. Ventilate installation area during installation and for 72 hours after installation.
 - D. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work has been tested, approved, and completed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Manufacturers and products specified on Drawings.
 - 2. Substitutions: Not permitted.

2.02 GENERAL PRODUCT REQUIREMENTS

- A. General: Comply with material ingredient, recycled content, source location, and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
- B. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- C. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- E. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- F. Low-Emitting Materials (EQc2):

1.

- Adhesives & Sealants:
- a. Adhesives and Sealants applied on site within the weather proofing system in this section must comply with South Coast Air Quality Management District Rule 1168 effective October 6, 2017 for VOC content. Products must also comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 01 8113 for specific VOC requirements.

G. Low-Emitting Materials (EQc2): Flooring.

 Carpet in this section must meet the requirements of the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Carpet must also meet the Carpet and Rug Institute's Green Label Plus program. Carpet cushion in this section must meet the requirements of the Carpet and Rug Institute Green Label program. All hard surface flooring must meet testing and product requirements of FloorScore. Concrete, wood, bamboo, and cork floor finishes such as sealer, stain, and finish must meet the requirements of California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. All tile setting adhesives and grouts must meet the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.

2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Molding and Edge Strips: Extruded or molded heavy duty vinyl or rubber type; profiles as detailed on Drawings; colors selected by Architect from manufacturer's standards.
- C. Resilient Wall Base: Specified in Section 09 6500.
- D. Adhesives: Recommended by carpet tile manufacturer; releasable adhesive pads.
 1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 8113.
- E. Miscellaneous Materials: Provide other items recommended by carpet manufacturer and installer for the indicated conditions of carpet use, and as required for complete installation.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
 - B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
 - C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
 - D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI 104 (Commercial).
- C. Blend carpet from different cartons to ensure minimal variation in color match.

09 6813 - 3 TILE CARPETING

- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in indicated pattern, with pile direction alternating to next unit, set parallel to building lines unless otherwise indicated on Drawings.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Fully adhere carpet tile to substrate.
- H. Trim carpet tile neatly at walls and around interruptions.
- I. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

3.05 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Protect flooring from accumulation of construction debris; cover after observation of installation by Architect.

WALL COVERINGS

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Surface preparation.
 - B. Wall covering.
- 1.02 REFERENCE STANDARDS
 - A. ASTM D1308 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
 - B. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide data on wall covering and adhesive.
- C. Shop Drawings: Indicate wall elevations with seaming layout.
- D. Samples: Submit two samples of wall covering, 18 by 18 inch in size illustrating color, finish, and texture.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Wall Covering Materials: 25 linear feet of each color and pattern of wall covering; store where directed.
 - 2. Package and label each roll by manufacturer, color and pattern, and destination room number.
- 1.04 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Material ingredients.
 - 4. Indoor-emissions-restrictions.
 - 5. VOC-content-restrictions.
 - 6. Other specified sustainable design requirements identified as such in this Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this Section with minimum five years of experience.

1.06 MOCK-UP

- A. Mock-up: Provide panel, three panel drops wide, full height, illustrating installed wall covering and joint seaming technique.
 - 1. Locate where directed.
 - 2. Mock-up may remain as part of the Work.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver materials in original packages or containers clearly labeled to identify manufacturer, brand name, quality and grade, and fire hazard classification.

- B. Inspect roll materials at arrival on site, to verify acceptability.
- C. Protect packaged adhesive from temperature cycling and cold temperatures.
- D. Store materials in a well ventilated area protected from weather, moisture, soiling, and extreme temperatures and humidity. Maintain temperature is storage area above 40 degrees F.
- E. Protect packaged adhesive from temperature cycling and cold temperatures.
- F. Do not store roll goods on end.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
- B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces during installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Manufacturers and products specified on Drawings.
 - 2. Substitutions: See Section 01 6300 Substitutions.
 - a. Acceptability of substituted items may be determined solely on the basis of design, appearance or finish.

2.02 WALL COVERINGS

- A. General Requirements:
 - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
 - 2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.
 - 3. General: Comply with material ingredient, source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
- B. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- C. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- E. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- F. Low-Emitting Materials (EQc2):

1.

- Adhesives & Sealants:
- a. Adhesives and Sealants applied on site within the weather proofing system in this section must comply with South Coast Air Quality Management District Rule 1168 effective October 6, 2017 for VOC content. Products must also comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 01 8113 for specific VOC requirements.

09 7200 - 2 WALL COVERINGS

- G. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.
- H. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.
- I. Substrate Primer and Sealer: Free of volatile organic compounds (VOC); wall covering manufacturer's recommended type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work, and comply with requirements of wall covering manufacturer.
- B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

- A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.
- C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces that affect work of this Section. Remove existing coatings that exhibit loose surface defects.
- E. Marks: Seal with shellac those that may bleed through surface finishes.
- F. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.
- G. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

- A. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- B. Use wall covering in roll number sequence.
- C. Razor trim edges. Do not razor cut on gypsum board surfaces.
- D. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- E. Horizontal seams are not acceptable.
- F. Do not seam within 2 inches of internal corners or within 6 inches of external corners.
- G. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.
- H. Do not install wall covering more than 1/4 inch below top of resilient base.
- I. Cover spaces above and below windows, above doors, in pattern sequence from roll.
- J. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.
- 3.04 CLEANING
 - A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
 - B. Reinstall wall plates and accessories removed prior to work of this Section.

3.05 PROTECTION

A. Do not permit construction activities at or near finished wall covering areas.

SOUND ABSORBING WALL AND CEILING FINISHES

PART 1 GENERAL

1.01 SUMMARY

A. Provide sound-absorbing wall and ceiling finishes where shown on the Drawings and as specified herein.

1.02 REFERENCE STANDARDS

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials, 2012.
- B. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- C. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Submit manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Submit shop drawings showing layout, edge profiles, accessories, finish colors and textures.
 - a. Shop drawings shall include plans, elevations, sections, and mounting devices and details. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials. Include details at cutouts and penetrations for other work. Include direction of fabric weave and pattern matching.
 - 5. Independent testing agency test reports.
- C. Selection Samples: Submit selection and verification samples of finishes, colors and textures.

1.04 SUSTAINABLE DESIGN SUBMITTALS

- A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittals requirements.
- B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements or sustainable design; whether or not specified in this Section, including, but not limited to:
 - 1. Environmental product declarations (EPD).
 - 2. Material ingredients.
 - 3. Indoor emissions restrictions
 - 4. VOC content restrictions
 - 5. Other specified sustainable design requirements identified as such in this Section.
- C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2): Option 1 Environmental Product Declaration (EPD)
 - 1. Submit product data or other published information verifying that this product has an EPD. Submit in accordance with Section 018113, LEED Submittals MRc2 Building Product Disclosure and Optimization Environmental Product Declarations.
 - 2. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- D. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3): Option 2 Leadership Extraction Practices
 - 1. Recycled content:
 - a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.

- E. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3): Option 2 Leadership Extraction Practices
 - 1. Extended producer responsibility:
 - a. Submit product data or other published information indicating that product manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility.
 - b. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- F. Building Product Disclosure and Optimization: Material Ingredients (MRc4): Option 1 Material Ingredient Reporting
 - Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm): Manufacturer inventory of all ingredients or Health Product Declaration, Declare, Living Product Challenge, Cradle to Cradle v2 Basic or v3 Bronze, Product Lens Certification, Facts - NSF/ANSI 336, ANSI/BIFMA e3 Furniture Sustainability Standard; or other USGBC approved program, if applicable.
 - 2. Include information on USGBC's v4.1 Building Product Disclosure and Optimization Calculator.
- G. Low Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - b. Include information on USGBC's v4.1 Low Emitting Materials Calculator.
- 1.05 FIRE AND SMOKE RATINGS
 - A. Performance Requirements Surface Burning Characteristics (ASTM E84):
 - 1. Flame Spread: 25, maximum.
 - 2. Smoke Developed: 450, maximum.
 - 3. Fire ratings for all fabric-covered panels are based on testing of the panel wrapped with the standard in stock fabric, Guilford of Maine, Model FR 701.
 - 4. This rating applies to all acoustical wall treatment.
- 1.06 QUALITY ASSURANCE
 - A. Installer Qualifications: Acceptable to the manufacturer of the acoustical products being installed.
 - B. Basis of Design: Specifications are based on acoustic product types by specified basis of design manufacturer. Acoustic product types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, performance, weight, size, profile, and other essential characteristics are minor, and do not detract substantially from the indicated design intent.
 - 1. Comply with requirements specified in Section 01 4000 and Section 01 6300.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Protect acoustical products from moisture during shipment, storage, and handling. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - B. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- 1.08 FIELD CONDITIONS
 - A. Do not begin installation of acoustical products until building has been enclosed and environmental conditions approximate those that will prevail when building is occupied.
 - B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 EXTRA STOCK

A. Deliver to the Owner matching replacement stock of 2% of installed quantity. Provide materials from same production run as those installed. Provide in colors as directed by the Architect or the Project Manager.

1.10 WARRANTY

- A. See 01 7300 Operation and Maintenance Data, for additional warranty requirements.
- B. Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Fabric sagging or distorting.
 - 2. Warping of core.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide products manufactured by:
 - 1. Basis of Design: Conwed Designscape.
 - 2. Autex.
 - 3. F-Sorb.
 - 4. Substitutions: See Section 01 6300 Substitutions, for substitution procedures.
- B. Provide all acoustical products specified herein by a single manufacturer.
- C. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E84, unless otherwise specified.
- D. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- E. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3), Recycled Content (MRc3.2):
 - 1. Preference should be given to materials/products that have post- and/or pre-consumer recycled content by weight of total product.
- F. Building Product Disclosure and Optimization: Sourcing of Raw Materials (MRc3):
 - 1. Preference should be given to materials/products that meet the LEED requirements for extended producer responsibility.
- G. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- H. Low-Emitting Materials (EQc2):
 - 1. Ceilings, walls, thermal and acoustic insulation:
 - a. Ceilings, walls, thermal and acoustic insulation installed within the weather proofing system in this section must comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Refer to Sustainable Design Requirements Section 018113 for specific VOC requirements.
- 2.02 SOUND ABSORBING WALL AND CEILING PANELS
 - A. General
 - 1. Comply with regionally-sourced, recycled content, adhesives and sealants, and volatile organic compound (VOC) product requirements specified in Section 01 6300 and Section 01 6116.
 - B. Fabric-Wrapped Sound-Absorbing Wall Panels:
 - 1. Basis-of-Design: Conwed Designscape Respond A100 or A200.
 - 2. Location: As indicated on the drawings.
 - 3. Size: As indicated on the drawings (maximum of 4' x 8').
 - 4. Core: 1-inch or 2-inch thick fiberglass (6-7 pcf), as indicated on the Drawings.
 - 5. Edge: As selected by the Architect.
 - 6. Facing: 100% polyester fabric, Guilford of Maine FR701.

- 7. Color: As selected by the Architect and shown on the Drawings.
- 8. Noise Reduction Coefficient (NRC): Minimum 0.80 (1-inch thickness) or 1.00 (2-inch thickness).
- 9. Mounting Accessories: Z-clip.
- C. Fiberglass Sound-Absorbing Stretched-Fabric System
 - 1. Basis-of-Design: Conwed Designscape Eurospan.
 - 2. Stretched-fabric panel system shall consist of continuous perimeter and butt seam mounting extrusions, site-fabricated, and applied directly to substrate.
 - 3. Facing fabric shall be stretched over core materials, leaving fabric floating above core surface. Fabric facing application shall not utilize adhesives, nails, tacks, screws, or tapes. Nails, tacks, screws or similar items shall not be installed through facing fabric to secure panel.
 - 4. System shall allow for removal and replacement of fabric facing from individual panels. Removal of fabric shall provide access to surface behind fabric, without dismantling, removal, or replacement of mounting extrusions or core material.
 - 5. Hinged, self-locking (snap-lock) type mounting extrusions and extrusions using tape to adhere fabrics do not satisfy intent of this specification.
 - 6. Two-piece mounting extrusions (snap-together) do not satisfy intent of this specification.
 - 7. Fabrication: Provide fabric with single pass, upholstery grade acrylic backing when required for proper installation. Other backings shall not be used without written approval from stretched fabric panel system manufacturer.
 - 8. Provide liner when required to ensure uniform appearance of face fabric.
 - 9. Color: As selected by Architect.
 - 10. Size: As indicated on drawings.
 - 11. Thickness: 1 inch or 2-inch thick fiberglass (as indicated on Drawings).
 - 12. Core material: Rigid tackable fiberglass board, 16 pcf.
 - 13. Facing: 100% polyester fabric, FR 701 Style 2100 by Guilford of Maine.
 - 14. Noise Reduction Coefficient (NRC): 0.85 (1-inch thickness) or 1.00 (2-inch thickness).
 - 15. Framework: Extruded polymer.
 - 16. Edge Profile: As selected by Architect.
 - 17. Midwall Profile: As selected by Architect.
- D. Black Sound-Absorbing Wall and Ceiling Board
 - 1. Product: Conwed Designscape SelectSound Board, or equal.
 - 2. Location: As indicated on the drawings.
 - 3. Size: As indicated on the drawings (maximum of 4' x 8').
 - 4. Core: 1-inch or 2-inch thick fiberglass (3 pcf), as indicated on the Drawings.
 - 5. Facing: Black mat facing. There shall be no labeling or branding on the face.
 - 6. Color: Black.
 - 7. Noise Reduction Coefficient (NRC): Minimum 0.70 (1-inch thickness) or 1.00 (2-inch thickness).
 - 8. Mounting Accessories: Manufacturer's adhesive.
 - a. When installing with adhesive, follow adhesive manufacturer's recommendations for surface preparation and pattern prior to installation.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Do not install panels until unsatisfactory conditions are corrected.

3.03 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.04 INSTALLATION

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Panel edges shall abut adjacent finishes or surfaces or to conform to adjacent joint conditions without reveals or gaps unless required by design.
- C. Visible surfaces shall be fully covered and free from wrinkles, sags, blisters, and foreign matter.
- D. Panel joints shall be tight, straight, true, plumb, and in proper relation to building lines.
- E. Seaming of fabric by sewing shall not be allowed.
- F. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as-new condition.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

INTERIOR PAINTING

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Surface preparation.
 - B. Field application of paints.
- 1.02 DEFINITIONS
 - A. Comply with ASTM D16 for interpretation of terms used in this section.
 - B. Gloss Ratings: ASTM D523; on 85 and 60 degree gloss meters:
 - 1. Flat: 0 to 15 (85 degree gloss meter).
 - 2. Eggshell: 5 to 20 (60 degree gloss meter).
 - 3. Satin: 15 to 35 (60 degree gloss meter).
 - 4. Semi-Gloss: 30 to 65 (60 degree gloss meter).
 - 5. Gloss (High): 65 and Greater (60 degree gloss meter).
- 1.03 REFERENCE STANDARDS
 - A. ASTM D16 Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - B. ASTM D4442 Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - C. ASTM D523 Standard Test Method for Specular Gloss.
 - D. MPI (APSM) Master Painters Institute Architectural Painting Specification Manual.
 - E. SSPC-SP 1 Solvent Cleaning.

1.04 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 3. Manufacturer's installation instructions.
- C. Samples: Submit two painted samples, illustrating selected colors for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 8 x 10 inch in size for sumbittal, 36 x 26 inch for site review by Owner.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 2. Label each container with color in addition to the manufacturer's label.
- 1.05 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.

- B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Material ingredients.
 - 4. Indoor-emissions-restrictions.
 - 5. VOC-content-restrictions.
 - 6. Other specified sustainable design requirements identified as such in this Section.
- C. Low Emitting Materials (EQc2): Paints and Coatings.
 - 1. For paints and coatings applied on site and inside the weatherproofing system, submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
 - For paints and coatings applied on site and inside the weatherproofing system, submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 3. Include information on USGBC's v4.1 Low Emitting Materials Calculator.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.
- B. Basis of Design: Specifications are based on paint types and systems by specified basis of design manufacturer. Paint types and systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in formulation, compatibility, and performance are minor, and do not detract substantially from the indicated design intent.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
 - B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
 - C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- 1.08 FIELD CONDITIONS
 - A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
 - B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
 - C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
 - D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
 - B. Acceptable Manufacturers:
 - 1. Basis of Design Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
 - 2. Benjamin Moore & Co.: www.benjaminmoore.com.
 - 3. Comex Group; Kwal Paint: www.thecomexgroup.com.



- 4. PPG Paints: www.ppgpaints.com/#sle.
- 5. Substitutions: See Section 01 6300 Substitutions.
- C. Acceptable Manufacturers Primer Sealers: Same manufacturer as top coats; no exceptions.

2.02 GENERAL PRODUCT REQUIREMENTS

- A. General: Comply with material ingredient, source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
- B. Low-Emitting Materials (EQc2): Paints and Coatings.
 - Paints and coatings applied on site within the weather proofing system in this section must comply with South Coast Air Quality Management District Rule 1113 effective February 5, 2016 OR California Air Resource Board (CARB) 2007 - Suggested Control Measures (SCM) for Architectural Coatings. Products must also comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
- C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
- D. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.

2.03 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- C. Colors: As scheduled on Drawings.

2.04 PAINT SYSTEMS

- A. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): High Performance Architectural Interior Latex; Wet area wall paint.
 - a. Acceptable Product:
 - 1) Sherwin-Williams Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #139)
 - 2) Substitutions: Section 01 6300 Substitutions.
 - 3. Top Coat(s): Institutional Low Odor/VOC Interior Latex; All applications unless otherwise specified.
 - a. Acceptable Products:
 - 1) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
 - 2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Low Sheen.
 - 3) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss.
 - 4) Substitutions: Section 01 6300 Substitutions.
 - 4. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 - b. Eggshell: MPI gloss level 3; use this sheen at all locations unless otherwise indicated or specified.
 - c. Semi-Gloss: MPI gloss level 5; use this sheen at metal fabrications not otherwise specified, and other scheduled locations.
 - 5. Primer: As recommended by top coat manufacturer for specific substrate.

- B. Medium Duty Metal Frame: For surfaces subject to frequent contact by occupants, including metals and wood:
 - 1. Medium duty applications include wood base trim, metal door frames and window frames.
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): High Performance Architectural Interior Latex.
 - a. Acceptable Products:
 - 1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #141)
 - 2) Substitutions: Section 01 6300 Substitutions.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Interior Wood: 6 to 8 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- F. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- G. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

09 9123 - 4 INTERIOR PAINTING
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

SECTION 09 9300

STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Surface preparation.
 - B. Field application of stains and transparent finishes.
- 1.02 REFERENCE STANDARDS
 - A. ASTM D4442 Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - B. MPI (APSM) Master Painters Institute Architectural Painting Specification Manual.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 1. Manufacturer's name, product name and/or catalog number, and general product category.
- C. Samples: Submit two samples, illustrating custom match colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished, 12 by 12 inch in size.
- 1.04 SUSTAINABLE DESIGN SUBMITTALS
 - A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
 - B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Material ingredients.
 - 4. Indoor-emissions-restrictions.
 - 5. VOC-content-restrictions.
 - 6. Other specified sustainable design requirements identified as such in this Section.
 - C. Low Emitting Materials (EQc2): Paints and Coatings.
 - 1. For paints and coatings applied on site and inside the weatherproofing system, submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
 - For paints and coatings applied on site and inside the weatherproofing system, submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.
 - 3. Include information on USGBC's v4.1 Low Emitting Materials Calculator.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.
- B. Basis of Design: Specifications are based on stain and finishing types and systems by specified basis of design manufacturer. Stain and finishing types and systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in formulation, compatibility, and performance are minor, and do not detract substantially from the indicated design intent.
- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperature: 50 degrees F unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces during application of finishes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide finishes used in any individual system from the same manufacturer; no exceptions.
- B. Acceptable Manufacturers:
 - 1. Basis of Design Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
 - 2. Benjamin Moore & Co.: www.benjaminmoore.com.
 - 3. Comex Group; Kwal Paint: www.thecomexgroup.com.
 - 4. PPG Paints: www.ppgpaints.com/#sle.
 - 5. Substitutions: See Section 01 6300 Substitutions.
- 2.02 GENERAL PRODUCT REQUIREMENTS
 - A. General: Comply with material ingredient, source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
 - B. Low-Emitting Materials (EQc2): Paints and Coatings.
 - Paints and coatings applied on site within the weather proofing system in this section must comply with South Coast Air Quality Management District Rule 1113 effective February 5, 2016 OR California Air Resource Board (CARB) 2007 - Suggested Control Measures (SCM) for Architectural Coatings. Products must also comply with the California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
 - C. Building Product Disclosure and Optimization: Environmental Product Declarations (MRc2):
 - 1. Preference should be given to materials/products that meet the requirements for the LEED credit MRc2, Environmental Product Declarations.
 - D. Building Product Disclosure and Optimization: Material Ingredients (MRc4):
 - 1. Preference should be given to materials/products that meet the LEED requirements for MRc4, Material Ingredient Reporting.
- 2.03 STAINS AND TRANSPARENT FINISHES GENERAL
 - A. Finishes:
 - 1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

Denver Central Library Interior Enhancements Project

- 3. Supply each finish material in quantity required to complete entire project's work from a single production run.
- 4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Flammability: Comply with applicable code for surface burning characteristics.
- C. Sheens: Provide custom sheens to match existing; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: Custom to match existing colors.
- 2.04 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS
 - A. Finish on Wood General Applications:
 - 1. 2 coat(s) varnish over 1 coat(s) stain.
 - 2. Stain: Semi-Transparent Stain for Wood.
 - a. Acceptable Product:
 - 1) Sherwin-Williams MinWax 250 VOC Oil Stain. (MPI #90)
 - 2) Substitutions: Section 01 6300 Substitutions.
 - 3. Top Coat(s): Polyurethane Varnish, High Build.
 - a. Acceptable Product:
 - 1) Sherwin-Williams MinWax High Build Polyurethane, custom sheens.
 - 2) Substitutions: Section 01 6300 Substitutions.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
 - B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
 - C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
 - D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- F. Reinstall items removed prior to finishing.
- 3.04 CLEANING
 - A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- 3.05 PROTECTION
 - A. Protect finishes until completion of project.
 - B. Touch-up damaged finishes after Substantial Completion.

SECTION 10 1400

SIGNAGE

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Room and door signs.
 - B. Interior directional and informational signs.
 - C. Signs required for Building Code compliance and building occupancy.
- 1.02 REFERENCE STANDARDS
 - A. 36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
 - B. ADA Standards Americans with Disabilities Act (ADA) Standards for Accessible Design.
 - C. ICC A117.1 Accessible and Usable Buildings and Facilities.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on Drawings, include the drawing room number on schedule.
 - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

1.04 SUSTAINABLE DESIGN SUBMITTALS

- A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
- B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Indoor-emissions-restrictions.
 - 4. VOC-content-restrictions.
 - 5. Other specified sustainable design requirements identified as such in this Section.

1.05 QUALITY ASSURANCE

A. Basis of Design: Specifications are based on sign types by specified basis of design manufacturer. Sign types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, profile, and finishes are minor, and do not detract substantially from the indicated design intent.

- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Package signs as required to prevent damage before installation.
 - B. Package room and door signs in sequential order of installation, labeled by floor or building.
 - C. Store tape adhesive at normal room temperature.

1.07 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

- 2.01 MANUFACTURERS
 - A. Basis of Design Manufacturer:
 - 1. Styles and Design: As indicated on Drawings.
 - 2. Substitutions: See Section 01 6300 Substitutions.
 - B. Unless otherwise specified for an individual product or material, supply all products specified in this Section from the same manufacturer.
- 2.02 CODE-REQUIRED SIGNAGE
 - A. General: Comply with source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
 - B. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
 - C. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
 - D. Interior Directional and Informational Signs:
 - 1. Sizes: As indicated on the Drawings.
 - 2. Wording of signs is scheduled on the Drawings.
 - 3. Where suspended, ceiling mounted, or projecting from wall signs are indicated, provide two-sided signs with same information on both sides.
 - E. Code-Required Door and Room Signs: Provide all signs required by Authority Having Jurisdiction (AHJ) for building occupancy; determine requirements and report to Owner and Architect prior to making specified submittals. Include cost of these signs in Contract Sum.

2.03 ACCESSORIES

- A. Mounting Devices: Except as specified for each sign type, provide mounting devices specifically recommended by manufacturer for indicated application; concealed upon finished installation.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Verify that substrate surfaces are ready to receive work.
- 3.02 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
 - B. Install neatly, with horizontal edges level.
 - C. Locate signs and mount at heights in accordance with ADA Standards and ICC A117.1.

- D. Locate signs where indicated:
 - 1. Room and Door Signs: Locate on wall at latch side of door with tactile characters located minimum 48 inches above finished floor and maximum 60 inches above finished floor, and 3 inches from door frame, unless indicated otherwise.
 - 2. If no location is indicated obtain Architect's instructions.
- E. Protect from damage until Substantial Completion; repair or replace damaged items.

SECTION 10 1429

ENVIRONMENTAL GRAPHICS

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. This Section includes the following types of environmental graphics:
 - 1. Type 1 COLUMN WRAP SIGNS
 - 2. Type 2 FLAG SIGNS
 - 3. Types 3A and 3B DIMENSIONAL LETTERS
 - 4. Types 4A and 4B VINYL
 - 5. Type 5 ADA SIGNAGE

1.02 REFERENCES

- A. ANSI 117.1 For Buildings and Facilities
- B. ASTM International (ASTM) D635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- C. ASTM International (ASTM) E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM International (ASTM) D1929 Standard Test Method for Determining Ignition Temperature of Plastics.
- E. Underwriters Laboratories (UL) 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
- F. Underwriters Laboratories (UL) 723 Standard for Test for Surface Burning Characteristics of Building Materials.
- G. ASTM E2072-04 Standard Specification for Photoluminescent (Phosphorescent) Safety Marketing.
- H. ASTM E2073-02 Standard Test Method for Photopic Luminance of Photo Luminescent (Phosphorescent) Markings.
- 1.03 PERFORMANCE REQUIREMENTS
 - A. Provide photopolymer signage that conforms to the requirements of all regulatory agencies holding jurisdiction.
 - B. Requirements:
 - 1. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design.
 - 2. Character Proportion: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
 - 3. Color Contrast: Characters and symbols must contrast with their background either light characters on a dark background or dark characters on a light background.
 - 4. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in (0.8 mm) minimum and be sans serif characters. Raised characters or symbols must be at least 5/8 in (16 mm) high but no higher than 2 in (50 mm). Symbols or pictograms on signs must be raised 1/32 in (0.8 mm) minimum.
 - 5. Symbols of Accessibility: Accessible facilities required to be identified must use the international symbol of accessibility.
 - 6. Braille: Grade II with accompanying text.
 - C. Fire Performance Characteristics:
 - 1. Provide photopolymer signage with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance to UL 723 (ASTM E 84).
 - 2. Self-Extinguishing: Provide photopolymer signage with a CC1 classification for .060 in thick material when tested in accordance with the procedures in ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position.

- 3. Vertical Burn: Provide photopolymer material that is classified as 94V-2 for material .118 in thick or greater and 94HB for material .118 in thick or less when tested in accordance with UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
- 4. Self-ignition temperature: Provide Photopolymer material that has selfignition temperature of 800° F (427° C) when tested in accordance with ASTM D 1929.
- 1.04 COORDINATION
 - A. Coordinate environmental graphic placement with surfaces, including but not limited to, finish textures and hardware, mechanical, electrical and plumbing devices and other applied elements.
 - B. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.05 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: For each type of environmental graphics/signage indicated, include details of construction relative to materials, dimensions of individual components, profiles and finishes.
- C. Shop Drawings:
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
 - 4. Drawings or other documentation, showing field conditions of all proposed substrates.
 - 5. Samples for Initial Selection: all sign types will be provided to verify the following:
 - a. Color
 - b. Material
 - c. Size
 - d. Kerning
- D. Mockups for Verification and Installation: Two approved mockups of all custom art to be provided. One to be kept at the vendor's shop for verification during the printing process and one to be kept on site for verification during installation. Each mockup must represent a section of the final product at full scale for verification of color, texture, material, scale, kerning and opacity during installation and must be approved by the designer. The following are minimum requirements of physical mockups:
 - 1. COLUMN WRAP SIGNS: (6) six inches x (6) six inches sample for all elements to verify thickness and color.
 - 2. FLAG SIGNS: (6) six inches x (6) six inches sample for all elements to verify thickness and color.
 - 3. DIMENSIONAL LETTERS: representative mockup of a section or letter.
 - 4. VINYL: (24) twenty-four inches x (36) thirty-six inches for each piece of art mocked up on an acrylic panel.
 - 5. ADA SIGNS: full size mockup of each sign type including, paint, Braille, ADA.
 - 6. ACCESSORIES AND HARDWARE: Manufacturer's full-size unit.
- E. Maintenance Data: For signs to include in maintenance manuals.
- F. Warranty: Special warranty specified in this Section.
- G. Record Documents: Provide documentation to Designer on any variations or deviations from Documents in the Manufacturing or Installation of products.
- H. Message List: Signage schedule indicating signage location, text and sign type.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Previous experience on projects of similar scope and scale. Installers must be able to wrap vinyl around hardware and other existing obstacles, with or without limited seaming. Installers must have the ability to install large format graphics and line up multiple panels while maintaining datum line and without skewing the graphic.

10 1429 - 2 ENVIRONMENTAL GRAPHICS

- B. Fabricator Qualifications: Must employ skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- C. Production Qualifications: Must have a large format printer, laminator and plotter that can handle a minimum or 48" wide material. Strong skills and success at color matching is mandatory along with the ability to maintain color consistency. Production personnel must have the ability to plot and weed cut letters at a minimum of .5" tall without warping.
- D. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- E. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Field testing shall be performed on mockups according to requirements in "Field Quality Control Article."
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial.
- G. Project Kick-Off meeting: Required prior to any art being issued.
- H. Installation Coordination: Designer must be notified 72 hours prior to installation to provide on-site approval of final placement of all artwork prior to installation.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Vendor must field verify all conditions and submit to Designer prior to finalizing production artwork.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

1.08 WARRANTY

- A. See Section 01 7400 Warranties and Bonds, for additional warranty requirements.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - 2. Deterioration of polymer finishes beyond normal weathering.
 - 3. Deterioration of embedded graphic image colors and sign lamination.
 - 4. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Nova Polymers, Inc.; 8 Evans St. Suite 201; Fairfield, NJ 07004; Toll Free Tel: 888-484-NOVA (6682); Email: request info (info@novapolymers.com); Web: www.novapolymers.com.
 - 2. Substitutions: Not permitted.
- 2.02 SIGN TYPES
 - A. Type 1 COLUMN WRAP SIGNS
 - 1. Sizes and square footages identified in sign schedule.

Denver Central Library Interior Enhancements Project

- 2. Material:
 - a. Glass panels with plotcut vinyl lettering applied to first surface and translucent gray vinyl fully covering the second surface. Panels are secured to the column via brass channels on top and on bottom, which wrap around the column, and are mounted to the column with hidden fasteners.
- 3. Art: Provided by Designer. Reference drawings for concepts and precedent imagery.
- B. Type 2 FLAG SIGNS
 - 1. Sizes and square footages identified in sign schedule.
 - 2. Material:
 - a. Metal sign consisting of a single piece of metal folded twice and powder-coated, with letters and male/female figures cut out. 1/8" Aluminum, Full Color Matthews Automotive Grade Paint.
 - 3. Art: Provided by Designer. Reference drawings for concepts and precedent imagery.
- C. Type 3A DIMENSIONAL LETTERS
 - 1. Sizes and square footages identified in sign schedule.
 - 2. Material: 1/4" Acrylic, Full color Matthews Automotive Grade Paint.
 - 3. Art: Provided by Designer. Reference drawings for concepts and precedent imagery.
- D. Type 3B DIMENSIONAL LETTERS (CHILDREN'S)
 - 1. Sizes and square footages identified in sign schedule.
 - 2. Material: layered Sign Foam cut at an angle, painted on faces and sides.
 - 3. Art: Provided by Designer. Reference drawings for concepts and precedent imagery.
- E. Type 4A PRINTED PLOTCUT VINYL
 - 1. Sizes and square footages identified in sign schedule.
 - 2. Material: 3M IJ180 Adhesive Vinyl, gloss finish 3M 8518 Laminate or matte finish 3M 8520 laminate (or equivalent).
 - 3. Art: Provided by Designer. Reference drawings for concepts and precedent imagery.
- F. Type 4B SPECIFIED PLOTCUT CAST VINYL
 - 1. Sizes and square footages identified in sign schedule.
 - 2. Material: 3M 7725 Adhesive Vinyl.
 - 3. provided by Designer. Reference drawings for concepts and precedent imagery.
- G. Type 5 ADA SIGNAGE
 - 1. Material: Match existing.
 - 2. Art: Match existing
- 2.03 SCHEDULE REFERENCE SIGN SCHEDULE IN DRAWINGS

PART 3 EXECUTION

- 3.01 EXAMINATION
 - A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - B. Verify that items, including anchor inserts, are sized and located to accommodate signs.
 - C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Subs will need to be prepared to schedule several separate rounds of install depending on time taken.
- B. Locate all art where shown or scheduled, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Vendor must get client and designer approval before for placement before final install of all signage elements.
 - 3. Heat treatment to all vinyl installations is required to maintain warranty.

3.03 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.
- 3.04 SCHEDULE
 - A. See sign schedule on Drawings.

SECTION 10 2619 WALL PROTECTION

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Corner guards.
- 1.02 REFERENCE STANDARDS
 - A. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 - B. ASTM D543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - C. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - D. ASTM F476 Standard Test Methods for Security of Swinging Door Assemblies.
 - E. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.03 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details.
- D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
 1. Submit two sections of corner guards, 12 inches long.
- E. Maintenance Data: For each type of product . Include information regarding recommended and potentially detrimental cleaning materials and methods.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- 1.05 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
 - B. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
 - C. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers Corner Guards:
 - 1. Babcock-Davis: www.babcockdavis.com/#sle.
 - 2. Construction Specialties, Inc.: www.c-sgroup.com/#sle.
 - 3. Inpro: www.inprocorp.com/#sle.
 - 4. Koroseal Interior Products: www.koroseal.com/#sle.
 - 5. Nystrom, Inc.: www.nystrom.com/#sle.
 - 6. Trim-Tex, Inc.: www.trim-tex.com/#sle.
 - 7. Substitutions: See Section 01 6300 Substitutions.

2.02 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.
- C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.03 PRODUCTS

- A. Corner Guards Surface Mounted:
 - 1. Material Type A: High impact vinyl with full height extruded aluminum retainer.
 - a. Color: As selected from manufacturer's standard colors.
 - b. Preformed end caps, wall wraps, and other features as indicated on Drawings.
 - 2. Material Type B: Type 304 stainless steel, No. 4 finish, minimum 12 gage, 0.01 inch thick.
 - 3. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 - 4. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 5. Width of Wings: 2 inches.
 - 6. Corner: Square.
 - 7. Length: One piece.
- B. Adhesives and Primers: As recommended by manufacturer.
 - 1. Comply with volatile organic compound (VOC) product requirements specified in Section 01 6116.

2.04 SOURCE QUALITY CONTROL

A. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as instructed by the manufacturer.
- B. Verify that substrate surfaces for adhered items are clean and smooth.
 - 1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.
- C. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches above finished floor to 60 inches high, unless otherwise indicated on Drawings.
- 3.03 TOLERANCES
 - A. Maximum Variation From Required Height: 1/4 inch.
 - B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.
- 3.04 CLEANING
 - A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

10 2619 - 2 WALL PROTECTION

SECTION 12 2400

WINDOW SHADES

PART 1 GENERAL

- 1.01 SECTION INCLUDES
 - A. Interior manual roller shades.
 - B. Interior motorized roller shades.
 - C. Motor controls.
- 1.02 REFERENCE STANDARDS
 - A. ADA Standards Americans with Disabilities Act (ADA) Standards for Accessible Design.
 - B. NFPA 70 National Electrical Code.
 - C. NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
 - D. UL (GGG) GREENGUARD Gold Certified Products.
 - E. UL 325 Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.
 - F. WCMA A100.1 Safety of Corded Window Covering Products.
- 1.03 ADMINISTRATIVE REQUIREMENTS
 - A. Coordination:
 - 1. Where motorized shades are to be controlled by control systems provided under other sections, coordinate the work with other trades to provide compatible products.
 - 2. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.
 - 3. Coordinate with window installation and placement of concealed blocking to support shades.
 - B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
 - 1. Discuss all installation and coordination requirements for successful shade system installation.
 - C. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.04 SUBMITTALS

- A. See Section 01 3000 Submittals, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
 1. Motorized Shades: Include power requirements and standard wiring diagrams for specified products.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
 - 1. Motorized Shades: Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
- D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E. Selection Samples: Include fabric samples in full range of available colors and patterns.
 1. Motorized Shades: Include finish selections for controls.
- F. Fabric Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

- G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.
- I. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

1.05 SUSTAINABLE DESIGN SUBMITTALS

- A. See Section 01 8113 Sustainable Design Requirements, for reporting and submittal requirements.
- B. Sustainable Design Documentation: Report(s) and separate submittal(s) documenting compliance with all requirements for sustainable design, whether or not specified in this Section, including, but not limited to:
 - 1. Source location.
 - 2. Environmental product declarations (EPD).
 - 3. Indoor-emissions-restrictions.
 - 4. VOC-content-restrictions.
 - 5. Other specified sustainable design requirements identified as such in this Section.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this type with minimum three years of documented experience with shading systems of similar size and type.
 - 1. Manufacturer's authorized representative.
 - 2. Factory training and demonstrated experience.
- 1.07 MOCK-UP
 - A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
 - 1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
 - 2. Full-sized mock-up may become part of the final installation.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
 - B. Handle and store shades in accordance with manufacturer's recommendations.
- 1.09 FIELD CONDITIONS
 - A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer:
 - 1. As specified in this Section or on Drawings for each shade and fabric type.
 - 2. Substitutions: See Section 01 6300 Substitutions.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 ROLLER SHADES

- A. General:
 - 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
 - 3. Manually Operated Shades: Comply with ADA Standards for operating pull force; maximum 5 lb.

- 4. Motorized Shades: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed or recognized to UL 325.
 - a. Comply with NFPA 70.
 - b. Electrical Components: Listed, classified, and labeled as suitable for the purpose intended. Where applicable, system components to be FCC compliant.
 - c. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view; fully compatible with controls to be installed.
- 5. Comply with source location and VOC content and emission restriction product requirements specified in Section 01 8113 Sustainable Design Requirements.
- B. Manually Operated Roller Shades:
 - 1. Basis of Design: Mecho; Mecho/5x System; www.mechoshade.com/#sle.
 - 2. Description: Single or double roller as indicated, manually operated fabric window shades.
 - a. Drop Position: Regular roll.
 - b. Mounting: Wall mounted.
 - c. Fabrics: As selected by Architect from manufacturer's full line
 - 3. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Steel, 1/8 inch thick.
 - b. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
 1) Light-Filtering Fabric: Room-side of opening.
 - 2) Room-Darkening Fabric: Glass-side of opening.
 - c. Multiple Shade Band Operation: Provide hardware as necessary to operate more than one shade band using a single clutch operator.
 - 4. Roller Tubes:
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
 - d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.
 - 5. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
 - 6. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
 - a. Provide a permanently lubricated brake assembly mounted on a oil-impregnated hub with wrapped spring clutch.
 - b. Brake must withstand minimum pull force of 50 pounds in the stopped position.
 - c. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
 - 7. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pound minimum breaking strength. Provide upper and lower limit stops.
 - a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
 - 8. Managed Lift: Required lifting force of 3 pounds to a maximum of 8.5 pounds for single band or multi-band shades up to 5 bands and a maximum of 30 pounds hanging weight.
 - 9. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; fabric wrapped finish to match shade.
 - 1) Configuration: Captured, fascia stops at captured bracket end.
 - b. Fasteners: Non-corrosive, and as recommended by shade manufacturer.
- C. Motorized Roller Shades:
 - 1. Basis of Design: Mecho; ElectroShade with WhisperShade IQ2 EDU, line voltage (120 VAC); www.mechoshade.com/#sle.

- 2. Description: Single roller, motor operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Mounting: Wall mounted.
 - c. Fabrics: As selected by Architect from manufacturer's full line
- 3. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Steel, 1/8 inch thick.
 - b. Multiple Shade Operation: Provide hardware as necessary to operate more than one shade using a single motor.
- 4. Roller Tubes:
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
- 5. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
 - b. Room-Darkening Shades: Provide a slot in bottom bar with wool-pile light seal.
- 6. Intelligent Encoded Electronic Drive System:
 - a. Line Voltage EDU (120 VAC):
 - 1) Audible Noise: 46 dBA or less measured 3 feet from the motor unit, depending on motor torque.
 - b. Modes of Operation:
 - 1) Uniform Mode: Allows for shades to move only to defined intermediate stop positions in order to maintain aesthetic uniformity.
 - 2) Normal Mode: Allows for shades to move to defined intermediate stop positions plus any position between defined upper and lower limits.
 - 3) Maintenance Mode: Prevents shade from moving to newly commanded positions via dry contact or network control commands until EDU has been serviced and/or Maintenance Mode has been cleared/disabled.
- 7. Control Methods: Support both local isolated dry contact input and network control.
 - a. Local isolated dry contact inputs support local switch control and third party system integration without separate interface.
 - b. Bi-directional network communication enables commanding the operation of large groups of shades over a common backbone.
 - c. Provide a minimum of three customizable preset positions accessible over the local dry contact control inputs and over the network connection.
 - d. Provide a minimum of 32 customizable preset positions (including the three local switch presets) accessible via network commands.
- 8. Accessories:
 - a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; baked enamel finish.
 - 1) Fascia to be capable of installation across two or more shade bands in one piece.
 - 2) Configuration: Captured, fascia stops at captured bracket end.
 - b. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.03 SHADE FABRIC

- A. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Basis of Design Manufacturer:
 - a. MechoShade Systems LLC; EuroVeil Basket Weave 5300 Series (5% open): www.mechoshade.com/#sle.
 - b. Substitutions: See Section 01 6300 Substitutions.
 - 2. Material: Vinyl coated polyester.

- 3. Material Certificates and Product Disclosures:
 - a. Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
 - b. Environmental Product Declaration (EPD): Complete, published declaration with full disclosure of known hazards.
- 4. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
- 5. Openness Factor: As selected by Architect from manufacturer's full line.
- 6. Roll Width: 72 inches.
- 7. Color: As selected by Architect from manufacturer's full range of colors.
- 2.04 MOTOR CONTROLS
 - A. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
 - B. Provide all components and connections necessary to interface with other systems as indicated.
 - C. Manual Controls:

2.

- 1. Control Functions:
 - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
 - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
 - c. Raise: Raise controlled shade(s) only while button is pressed.
 - d. Lower: Lower controlled shade(s) only while button is pressed.
 - e. Presets: For selection of predetermined shade positions.
 - f. Multiple Shade Groups: Provide individual controls for each shade group as indicated.
 - Wall Controls: Provided by shade manufacturer.
 - a. Finish: To be selected by Architect.
- 2.05 ROLLER SHADE FABRICATION
 - A. Field measure finished openings prior to ordering or fabrication.
 - B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 - 2. Horizontal Dimensions Inside Mounting: Fill openings from jamb to jamb.
 - 3. Horizontal Dimensions Outside Mounting: Cover window frames, trim, and casings completely.
 - C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window multion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.
- 3.04 SYSTEM STARTUP
 - A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.
- 3.05 CLEANING
 - A. Clean soiled shades and exposed components as recommended by manufacturer.
 - B. Replace shades that cannot be cleaned to "like new" condition.
- 3.06 CLOSEOUT ACTIVITIES
 - A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
 - B. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.
- 3.07 PROTECTION
 - A. Protect installed products from subsequent construction operations.
 - B. Touch-up, repair or replace damaged products before Substantial Completion.