# APPENDIX 6

# DESIGN AND CONSTRUCTION SPECIFICATIONS

# DIV 1

## (AS APPLICABLE TO THE PROJECT

## COMPLETE LIST PROVIDED IN VOL II PART 2)

# SECTION 011100 - SUMMARY OF WORK

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY AND 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. The Work in this Contract may affect operations at DEN. The Contractor shall bid, plan and execute the Work to minimize disruption of operations and inconvenience to the public.

C. Special Inspections:

1. Special Inspections and Testing required by the building official will be identified by the Construction Documents, Statement of Special Inspections, Building Permit(s) and/or 2015 international Building Code, will be performed by DEN contracted Agencies.

D. This Project will be administered using the Aconex (Aconex). The application will be supplied by DEN at no cost to the Contractor. DEN will provide Aconex training. Inspection Requirements:

1. Special Inspection and Testing required by the building official or the Engineer of Record in the Contract Documents or in the Statement of Special Inspections will be performed by DEN contracted Agencies.
2. Contractor shall perform Quality Control and Quality Assurance with the Design and Construction Quality Management Plan.
3. DEN Quality Assurance Manager may audit all material tests performed by the Contractor Quality Control at any time. Testing and Inspections for structural elements [**reinforced concrete, steel, masonry caissons, fire protection, precast and post tension concrete**] not identified as special inspection will be performed by the Contractor Quality Control Program and Contractor Material Testing Agency and audited and confirmed by DEN Quality Assurance Manager. DEN will perform 100% visual inspection on all weldments. DEN will perform Quality Assurance testing at a frequency of approximately 10% of the Quality Control test and inspection frequencies. The Contractor may not hire the DEN contracted testing agency in any capacity on this Project.

1.3 WORK BY OTHERS AND FUTURE WORK

A. Refer to Development Agreement.

1.4 SITE CONDITIONS

A. Refer to Development Agreement.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 CONTRACTOR'S DUTIES

3.2 COORDINATION – Refer to Development Agreement

A. Refer to Development Agreement

END OF SECTION **011100**

# SECTION 011400 - WORK SEQUENCE AND CONSTRAINTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 OTHER WORK

A. Other concurrent construction projects will be handled in accordance with the Contract Documents.

### 1.3 WORK SEQUENCE

A. The work sequence shall comply with Phasing, Sequencing, and Milestones as indicated in the Contract Documents and in accordance with the approved Construction Schedule developed by the Contractor.

### 1.4 WORK CONSTRAINTS

A. Site Constraints:

1. Access to the Project shall be generally as indicated in the Contract Documents. Access shall be organized and planned by the Contractor in coordination with DEN to ensure no disruption of airline or DEN operations.
2. Access to work sites will be strictly monitored and must comply with DEN Airport Operations and FAA Regulations. The Contractor shall provide monitoring and escorts as required by DEN Operations in the area of the Work.
3. The Contractor's staging area will be as indicated in the Contract Documents.
4. Contractor employee parking will not be allowed within the existing revenue control system. Parking facilities will be as indicated in the Contract Documents.
5. Material for work in the Terminal may be brought in through the Terminal Loading Dock accessed via Gate 1 and any other locations set forth in the Contract Documents. The Contractor shall use the haul routes specified in the Construction Documents.
6. If required, the Contractor shall provide a bus and driver to transport the Contractor’s employees between the designated employee parking area and the work sites. No separate payment will be made for this bus and driver. The cost shall be included in the bid item “Mobilization”. The bus driver shall be provided at all times when Contractor employees are working on the Project.

B. System Interruptions:

1. DEN is a 24/7/365 facility. Construction activity that requires any system shutdown must be coordinated with the project manager and DEN AIM MCC.
2. The Shutdown cannot proceed unless all approver groups have approved the request. If any of the groups rejects the request, you may not proceed with the Shutdown. If a Shutdown is determined to be an emergency due to pending health issues or the risk of additional damage, this process may be bypassed. If the Shutdown is an emergency, proceed with the shutdown without the approvals. Approvals must be obtained as follows

    a. Airfield Shutdowns must be submitted at least 72 hours prior to the shutdown start date.
    b. All other Shutdowns must be submitted at least five (5) business days prior to the shutdown start date.
    c. All Shutdown Requests must be submitted using the Shutdown Request form, which can be accessed via the Home page of the DEN intranet.

C. Airfield Operations at Denver International Airport:

1. Developer will comply with all Contract Documents for Operations rules and regulations.

    a. If any Work contains requirements for Work activities or access through or in the restricted area, reference Section 011420 "Security Requirements & Sensitive Security Information (SSI)" for requirements.
    b. If not in a restricted area, the Contractor personnel still must be badged; reference Section 011420 "Security Requirements & Sensitive Security Information (SSI).

D. Operational safety on airports during construction:

1. All Work shall be accomplished in accordance with FAA Advisory Circular AC150/5370-2C, "Operational Safety on Airports during Construction", FAR Part 139 and FAR Part 107 except as herein modified.

E. Welding Equipment, Procedures and Constraints:

1. Natural gas-powered portable welders or inverter single- and three-phase electric portable welders are the preferred welding equipment to be used inside the building basement or tunnel areas. If use of a gasoline, propane or diesel powered equipment is required, the contractor must comply with security requirements and Denver Fire requirements for safety and Firewatch including but not limited to exhaust scrubbers, confined space and OSHA requirements as more fully set forth in the Health, Safety and Environmental Policies.

2. Welding activities inside buildings require submittal of a System Interruption Request (See paragraph “System Interruptions” above). Prior to welding in any area, the Contractor shall locate smoke detectors and shall request interruption of the fire alarm system. Subsequent to the interruption of the fire alarm system and prior to welding activities, the Contractor shall cover and protect smoke detectors until work is complete. Prior to expiration of each interruption of the

system, the Contractor shall uncover the smoke detectors.

3. Electrical Service: The Contractor shall be responsible for verifying with the. DEN Project Manager or representatives locations acceptable for accessing electrical power for welders and other electrical equipment feeders. The Contractor shall be responsible for all work and equipment required to install temporary or permanent electrical modifications for construction power and lighting.

    a. Temporary Hook-up: In addition to the requirements of paragraph "Temporary Power and Lighting for Construction" below, comply with the following:

        1) Provide wiring sized to accommodate full load of welding equipment, accounting for voltage drop.
        2) Provide appropriate NEMA twist-lock or ANSI receptacle for welder hook-up.
        3) 480V, 3 phase, 3 pole, 4-wire twist lock ground line.
        4) NEMA L16-20 or ANSI C73.87.

    b. The Contractor may not begin operation of the equipment prior to request for inspection by DEN representatives and acceptance of the installation.
    c. Permanent installation of electrical branch circuiting for welding equipment shall be made in accordance with all Division 26 Specification Sections

4. Welding Practices: All standard safe welding practices must be followed, including but not limited to the following:

    a. Flash protection for surrounding areas.
    b. Contractor fire extinguisher in area.
    c. Compliance with DEN Fire Department Firewatch Criteria.
    d. Protect all equipment, cable trays and contents, etc., in area.
    e. Use fire blankets and other appropriate materials to confine sparks and molten metal from the welding, cutting, and/or grinding activities.
    f. All welders shall have been qualified through welding tests in accordance with applicable welding code, such as but not limited to AWS, ASME, API, within one year prior to welding taking place. Evidence of qualification shall be through Welding Performance Qualification Records (WPQR).
    g. All welder qualifications test shall be or shall have been administered and witnessed by an Independent Testing Agency (ITA), AWS Certified Welding Inspector (CWI).
    h. If recertification of welders is required, delay costs and retesting costs shall be borne by the Contractor.

5. Grounding: For temporary and permanent grounding points, review with DEN representative's area of work prior to beginning work to ensure ground procedures do not induce undesirable charges in steel building system or other systems. This review should take place subsequent to the pre-work meeting. Do not ground to adjacent building systems, baggage system, hangers, or devices that support mechanical or electrical equipment.

F. Temporary Power and Lighting for Construction:

1. The Contractor shall be responsible for all work and equipment required to install temporary or permanent electrical modifications for construction power and lighting.

    a. Comply with all requirements of NEC Article 590.
    b. Flexible cords used for temporary power shall be listed in accordance with NEC Article 400, and rated for 'extra-hard' usage.
    c. Provide an equipment grounding conductor with all temporary power circuits.
    d. All temporary power distribution devices and equipment shall be listed and rated for the application.
    e. Provide ground fault protection for personnel.
    f. Temporary lighting fixtures shall be protected from physical damage.

G. Cleaning Equipment and Spoils:

1. Discharge of water, liquids, or chemicals into a building sanitary sewer system or storm drainage systems is prohibited. The Contractor shall comply with all Federal, State, and Local requirements for disposal of chemicals and equipment wash water. The Contractor shall maintain and service all equipment in work areas and collect all wash water, spoils and water from excavations in containers for discharge or removal off site.

H. Vehicle Permitting for Tunnel and Basement Use:

1. Electric carts require permitting. The Contractor shall provide at least one (1) electric cart for Contractor use during the work in the tunnel and basements of the buildings. Only electric or CNG powered trucks are allowed in the tunnel and basements of the buildings. Only electric or CNG trucks may be used and shall not be parked overnight or for long terms within the tunnel or basements. All vehicles require permitting. Permits may be acquired at the DEN Airport Security Office.

I. Radio and Cell Phone Use:

1. The Contractor shall have wireless communications in place prior to initiation of work in the tunnel or basements by use of cell phone and/or radio. Radio and cell phone coverage in the tunnels and basements varies in signal strength throughout the campus. An RF Application must be submitted for the Radio equipment intended for use at least 14 days prior to intended use. Include the following radio information:

    a. Make
    b. Model
    c. Frequency
    d. Effective Radiated Power (ERP)

2. Contractors must receive an approval letter from the RF Systems Manager prior to use of the radio equipment on the DEN campus.

J. Keys:

1. The Contractor shall be required to contact DEN Maintenance Control to procure keys for access to all rooms having locks in order to gain access. Keys may be checked out at the beginning of each work shift by the Contractor and shall be returned to DEN Maintenance Control at the end of each work shift

## 1.5 COORDINATION

A. Coordination will be done in accordance with the Contract Documents.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

## 3.1 DUST/PROTECTION BARRIERS

A. HVAC system containment. The Contractor shall submit to DEN Maintenance HVAC and Fire Alarm shutdown requests prior to modifications to the area of work for dust containment. The HVAC system shall be interrupted, re-routed, or blocked off to prevent dust from entering return or supply ducts.

B. Debris and Protection Barriers: The Contractor shall construct code-approved and DEN-approved dust and debris barriers on both sides of walls and doors that are to be modified. Barriers shall be constructed to allow emergency ingress and egress to and from equipment and spaces. Barriers shall be constructed to allow continual uninterrupted function of building equipment and spaces.

1. Return all removed door hardware to DEN. Label each hardware set correlating the door number of the original hardware set. Coordinate with the DEN Project Manager for storage and return of hardware.

## 3.2 EQUIPMENT

A. Equipment: CNG-powered equipment is allowed within the buildings. If use of a gasoline, propane or diesel powered equipment is required, the contractor must comply with Denver Fire requirements for safety and Firewatch including but not limited to exhaust scrubbers, confined space and OSHA requirements.

B. Electric: Electric powered equipment is acceptable in the Work area. DEN coordination is required for all temporary service connections.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 011400

# SECTION 011420 - SECURITY REQUIREMENTS & SENSITIVE SECURITY INFORMATION (SSI)

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 DESCRIPTION

A. Each Contractor is required to become a “Participant” in the DEN Airport Security Program (ASP), and must remain in good standing in order to retain Airport Security privileges.

B. All Contractor employees and all vehicles requiring access to the Secured Area, Sterile Area, and/or any other Controlled Areas shall be required to obtain the proper access authorizations for Airport ID badges and vehicle permits.

### 1.3 PARTICIPANT OF AIRPORT SECURITY PROGRAM

A. Contractors are required to become a “Participant" of the ASP. In order to become a “Participant”, your company must attend a Participant meeting within the Airport Security Office.

B. The Contractor shall comply with all Denver Municipal Airport System Rules and Regulations and all Transportation Security Administration (TSA) regulations. Special emphasis should be paid to Denver Municipal Airport System Rules and Regulations Part 20 – Airport Security Rules and Regulations and Part 130 – Operating Vehicles In The Secured Area" and Part 35 – Operations Infraction Accountability Program". The Denver Municipal Airport System Rules and Regulations can be found on the flydenver.com website.

C. The TSA has the authority to issue civil penalties for failure to adhere to their regulations.

D. It is the responsibility of the Airport Security Office to ensure all fences and gates are secure. If a Contractor's operations necessitate the frequent use of a particular gate, the Contractor shall place, at the Contractor’s expense, two (2) contract security guards at the gate that shall have been trained and certified by the Airport Operations Division to facilitate access to its Work. The Contractor assumes full responsibility for maintaining security once this is done. If the perimeter gate will be used as a haul route, the contractor must also place, at the Contractor’s expense, Haul Route Monitors as dictated by the TSA approved Temporary Amendment. Any fines levied

against the Airport as a result of the failure by the Contractor to provide adequate security shall be passed on to the Contractor.

1. If the Contractor provides guards or monitors, the Contractor must also supply a shelter for the guards/monitors. The shelter must meet the following requirements:

    a. One 10 x 12 Tuff Shed or similar type structure with a window, 24-inch convex mirror mounted outside for vehicle inspection, sufficient HVAC capability, generator, light plant, and sanitary services, which are maintained by the Contractor.

E. Contractors will be required at all times to have a supervisor or foreman at each work location in Secured, Sterile, and Controlled Areas.

F. All Work shall be accomplished in accordance with the most current FAA Advisory Circular (AC) 150/5370-2, "Operational Safety on Airports during Construction", 49 Code of Federal Regulations (CFR) Part 1542 and 14 CFR Part 139 except as modified herein.

G. All Work shall be accomplished in accordance with the most current TSA Security Directives applicable to DEN, except as modified herein.

H. This Section intends to supplement, modify, change, delete from, or add to the most current FAA AC150/5370-2. Where any paragraph, subparagraph, or clause of the AC is modified or deleted by these supplements, the unaltered provisions of that paragraph, subparagraph, or clause shall remain in effect.

## 1.4 SENSITIVE SECURITY INFORMATION (SSI)

A. If the Contract involves SSI information or procedures, the Contractor must contact the Assistant Director of Airport Security or designee, for disclosure information, as well as protocols that must be followed with SSI distribution.

B. This Section governs the maintenance, safeguarding, and disclosure of records and information that the TSA has determined to be SSI as defined by 49 CFR Part 1520, "Protection of Sensitive Security Information". SSI is information that the TSA has determined to be detrimental to the security of Denver International Airport if disclosed to unauthorized persons. This is a process for the documentation, use, and recovery of SSI of a specific origin.

C. Applicability:

1. For all management staff, all authorized departments, all contractors, and subcontractors handling documents or materials containing SSI information.
2. Each person employed by, contracted to, or acting on behalf of the Department of Aviation at Denver International Airport is subject to the requirements of this Section.
3. SSI disclosure is limited to persons or entities under criteria identified in federal

regulations, subject to strict “need-to-know” standard, and as otherwise determined by TSA or the Department of Homeland Security (DHS).

D. Except as otherwise provided in this Section, records containing SSI are not available for public inspection or copying. Denver International Airport will not release such records to persons without a need to know. Prime contractors will not release SSI records to any subcontractor without a need to know. An employee or contractor has a “need to know” SSI if access to the information is necessary for performance of his or her official duties.

E. Unauthorized disclosure of SSI is a Federal violation of 49 CFR Part 1520 and violation is grounds for a civil penalty and other enforcement action by DHS Security. In addition to the civil penalties, corrective action may include issuance of an order requiring retrieval of SSI to remedy unauthorized disclosure, an order to cease future unauthorized disclosure, and dismissal from the work site.

F. Except as otherwise provided in writing by the TSA in the interest of public safety or airport security, the following information and records containing such information constitute SSI:

1. Information that would be detrimental to the security of Denver International Airport and aviation transportation.
2. Any performance specification, including a description of devices and procedures used by Denver International Airport, for the detection of any weapon, explosive, incendiary, or destructive substance.
3. Any performance specification, including a description of devices and procedures, for any communications equipment used by Denver International Airport in carrying out any aviation transportation security requirements.
4. Details of any security inspection or investigation of an alleged violation of aviation transportation security requirements of Federal law that could reveal security vulnerability.
5. Specific details of aviation transportation security measures including those recommended by the Federal government.
6. The following information regarding security screening under aviation transportation security requirements of Federal law:

    a. Procedures for screening of persons, property, checked baggage, U.S. mail, and cargo.
    b. Information used by a passenger or property-screening program or system, including an automated screening system.
    c. Detailed information, if determined by the TSA to be SSI, about the locations at which particular screening methods or equipment are used.
    d. Performance or test data from security equipment or screening systems.

7. Identifying information of certain aviation transportation security personnel including lists of the names or other identifying information that identify persons as having unescorted access to a secure area of the airport.
8. Critical aviation asset information identifying systems so vital to the airport that the incapacity or destruction of such assets would have a debilitating impact on

aviation security.

9. Any information involving the security of operational or administrative data systems identified by the Department of Transportation or DHS as critical to the safety or security of Denver International Airport.
10. Solicited or unsolicited proposals, pursuant to a grant or contract, to perform work that relates to security measures.

G. Restrictions on the Disclosure of SSI:

1. Employees and contractors working onsite have a duty to protect sensitive security information and must take reasonable steps to safeguard SSI in that person's possession from unauthorized disclosure. When a person is not in physical possession of SSI, the person must store it in a secure container such as a locked desk, a locked file cabinet, or in a locked room. SSI is to be disclosed only to persons having a need to know as stated in CFR 1520. Requests for SSI are to be referred to City Project Manager.
2. Prior to receiving SSI records, contractors must sign the "Confidentiality and Non-Disclosure Agreement", Form PS-17, stating that SSI will be guarded from unauthorized persons, that records will be controlled while in use and secured when not in use, and that all SSI plans and records will be returned to the airport or destroyed following the completion of the Project.
3. Return or destruction of SSI documents must be done in a timely manner and documented on the SSI Return or Destruction Compliance Form, Form PS-20. Companies under contract to the City must return or destroy all SSI material following the completion of the Work. Companies not selected during the bidding process must return or destroy all SSI material immediately following the announcement of bid results.

H. If a record containing SSI is received that is not marked as specified in this Section below, the following steps must be taken:

1. Mark the record as specified in paragraph Part 1 of this Section.
2. Inform the sender of the record that the record must be marked as specified in Part 1 of this Section.

I. If a person becomes aware that SSI has been released to unauthorized persons, promptly inform the Communication Center Supervisor at 303-342-4020 and request to speak to the on-call Airport Security Coordinator

J. Marking SSI:

1. In the case of paper records containing SSI, a covered person must mark the record by placing the PROTECTIVE MARKING conspicuously on the top, and the DISTRIBUTION LIMITATION STATEMENT on the bottom, of following parts of the document:

a. The outside of any front and back cover, including a binder cover or folder, if the document has a front and back cover.
b. Any title page
c. Each page of the document

2. Protective Marking:

    a. SENSITIVE SECURITY INFORMATION
    b. Distribution Limitation Statement:
    c. WARNING: This record contains Sensitive Security Information that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a “need to know”, as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520

3. In the case of non-paper records that contain SSI, including motion picture films, videotape recordings, audio recording, and electronic and magnetic records, a covered person must clearly and conspicuously mark the records with the protective marking and the distribution limitation statement such that the viewer or listener is reasonably likely to see or hear them when obtaining access to the contents of the record.

K. Destruction of SSI:

1. When the employee or contractor no longer needs the SSI to carry out their work requirements, the SSI must be returned to the issuing entity or completely destroyed by burning or cross-shredding to preclude recognition or reconstruction of the information.
2. The Contractor shall comply with all the requirements of the Department of Aviation Standards and Procedures, Protection of Sensitive Security Information (SSI) No. 10003 Revised 08/01/15 regarding Contractor Protection of Sensitive Security Information (SSI).

## 1.5 MISCELLANEOUS

A. Dumpster Security Requirements:

1. The following procedures must be followed to provide maximum security with all construction projects in public areas unless an exception has been made by the Airport Security Coordinator (ASC) or designee:

    a. Roll-off dumpsters must have the ability to be covered (hard side) and locked when not in use.
    b. When unlocked and in use, the Contractor shall provide an employee, or a subcontractor’s employee, to stand by the dumpster to prevent unauthorized placement of prohibited items

2. If the Contractor is not able to have a roll-off dumpster with the ability to be locked, the dumpster shall be removed from the public area when the construction site is inactive.

B. Contractor Fences (Not Perimeter Fence):

1. If required, the Contractor shall establish and maintain a secure (fenced) perimeter at its primary operations area to include its field offices, staging and storage areas, and maintenance facilities. The responsibility for security within its operations area shall rest solely with the Contractor. Entrance gates to operations areas shall be equipped with a combination of locks to include a lock provided by the City for its use in accessing emergency equipment, should that need arise. The location, size and other physical characteristics of the Contractor's operations area must be approved by the DEN Project Manager prior to its installation.
2. Unless specifically required by the Contract Documents and with the exception of the fenced operations area described above, the Contractor shall install no fences or other physical obstructions on or around the Project work area without the written approval of the DEN Project Manager.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 SUBMITTAL FOR AIRPORT ID BADGES

A. By submitting information for the individual requesting or requiring an Airport ID badge that would permit unescorted access to the Sterile and/or Secured Areas must be fingerprinted and pass a Criminal History Records Check (CHRC) and Security Threat Assessment (STA). Passing a CHRC means the employee shall not have been convicted, given a deferred sentence, found not guilty by reason of insanity or have been arrested and are awaiting judicial proceedings of any felony charge during the ten (10) years before the date of the individual’s application for unescorted access authority. For an individual to obtain driver authorization to drive within the Secured Area, the individual must have a valid driver license that allows them to drive their contractor vehicle.

B. An employee requesting an Airport ID badge must resolve all pending or valid violations before being allowed to proceed in the airport ID badging process. If the employee no longer works for the company and is attempting to be employed by a different company, a management representative from the “new” company must attend the Violation Notice Hearing along with the employee.

C. Airport ID Badges are obtained as follows:

1. The Contractor shall meet with the City Project Manager to review the procedures and required access points at DEN. The Contractor and the DEN Project Manager shall visit the site to verify the access points. Access points shall be listed and submitted by the Contractor to the DEN Project Manager for review and comment prior to Contractor’s application for badging.
2. The Contractor shall designate an Authorized Signatory who must attend an

annual class with Airport Security. The Authorized Signatory must be an employee of the Contractor, have a valid Denver International Airport ID badge. The Authorized Signatory will be authorized to sign for the Contractor on the Fingerprinting and Badge Application Form and will be the primary designation contact for Airport Security related business.

3. The Contractor's Authorized Signatory shall schedule a Participant Meeting with the DEN Airport Security Office to review DEN security procedures and receive training on how to ensure that all Participants remain in compliance with Part 20 of the Denver Municipal Airport System Rules and Regulations. A second meeting will be scheduled for the Authorized Signatory to learn how to successfully complete the required forms for Airport ID badges and vehicle permits.
4. A CHRC and STA are required for each employee requesting unescorted access to the Secure and/or Sterile Area. The employee will complete the Fingerprinting and Badge Application (two-sided form) and schedule an appointment with the Airport Security Office to have the form reviewed and to be fingerprinted. The Federal Bureau of Investigation will conduct the CHRC and will return the results to the Airport Security Office. For the fee for the Fingerprinting, please see the flydenver.com website. The Transportation Security Administration will process the STA and will return the results to the Airport Security Office.
5. When the Authorized Signatory is notified by Airport Security that the CHRC and STA have cleared, the applicants must come to the Airport Security Office to receive regulated security and driver training. The training will take approximately one (1) hour for security training and approximately two (2) hours for security and driver training.
6. All applicants must watch and pass all concepts of a computer based security training module for a Security Identification Display Area (SIDA) Airport ID badge. All individuals requesting driver authorization in the non-movement area must also view an interactive computer based driver training module and complete a test by passing all concepts. In addition, the individual must receive non-movement driver orientation training by the Contractor’s driver representative before being allowed to drive on the airfield. Non Movement Orientation training should be conducted annually.
7. All Airport ID badges must be immediately terminated upon employee separation from the Contractor or when a need for DEN access no longer exists.
8. The Airport ID badges must be returned to the Airport Security Office prior to final payment. All Airport ID badges are issued with an annual expiration date. The expiration date is determined by the birthday of the Airport ID badge holder. Contractors shall notify the DEN Project Manager as soon as possible but in no case less than four (4) weeks in advance of any requirement to extend the Sponsorship status.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **011420**

# SECTION 011420 - SECURITY REQUIREMENTS & SENSITIVE SECURITY INFORMATION (SSI)

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 DESCRIPTION

A. Each Contractor is required to become a “Participant” in the DEN Airport Security Program (ASP), and must remain in good standing in order to retain Airport Security privileges.

B. All Contractor employees and all vehicles requiring access to the Secured Area, Sterile Area, and/or any other Controlled Areas shall be required to obtain the proper access authorizations for Airport ID badges and vehicle permits.

### 1.3 PARTICIPANT OF AIRPORT SECURITY PROGRAM

A. Contractors are required to become a “Participant" of the ASP. In order to become a “Participant”, your company must attend a Participant meeting within the Airport Security Office.

B. The Contractor shall comply with all Denver Municipal Airport System Rules and Regulations and all Transportation Security Administration (TSA) regulations. Special emphasis should be paid to Denver Municipal Airport System Rules and Regulations Part 20 – Airport Security Rules and Regulations and Part 130 – Operating Vehicles In The Secured Area" and Part 35 – Operations Infraction Accountability Program". The Denver Municipal Airport System Rules and Regulations can be found on the flydenver.com website.

C. The TSA has the authority to issue civil penalties for failure to adhere to their regulations.

D. It is the responsibility of the Airport Security Office to ensure all fences and gates are secure. If a Contractor's operations necessitate the frequent use of a particular gate, the Contractor shall place, at the Contractor’s expense, two (2) contract security guards at the gate that shall have been trained and certified by the Airport Operations Division to facilitate access to its Work. The Contractor assumes full responsibility for maintaining security once this is done. If the perimeter gate will be used as a haul route, the contractor must also place, at the Contractor’s expense, Haul Route Monitors as dictated by the TSA approved Temporary Amendment. Any fines levied

against the Airport as a result of the failure by the Contractor to provide adequate security shall be passed on to the Contractor.

1. If the Contractor provides guards or monitors, the Contractor must also supply a shelter for the guards/monitors. The shelter must meet the following requirements:

    a. One 10 x 12 Tuff Shed or similar type structure with a window, 24-inch convex mirror mounted outside for vehicle inspection, sufficient HVAC capability, generator, light plant, and sanitary services, which are maintained by the Contractor.

E. Contractors will be required at all times to have a supervisor or foreman at each work location in Secured, Sterile, and Controlled Areas.

F. All Work shall be accomplished in accordance with the most current FAA Advisory Circular (AC) 150/5370-2, "Operational Safety on Airports during Construction", 49 Code of Federal Regulations (CFR) Part 1542 and 14 CFR Part 139 except as modified herein.

G. All Work shall be accomplished in accordance with the most current TSA Security Directives applicable to DEN, except as modified herein.

H. This Section intends to supplement, modify, change, delete from, or add to the most current FAA AC150/5370-2. Where any paragraph, subparagraph, or clause of the AC is modified or deleted by these supplements, the unaltered provisions of that paragraph, subparagraph, or clause shall remain in effect.

## 1.4 SENSITIVE SECURITY INFORMATION (SSI)

A. If the Contract involves SSI information or procedures, the Contractor must contact the Assistant Director of Airport Security or designee, for disclosure information, as well as protocols that must be followed with SSI distribution.

B. This Section governs the maintenance, safeguarding, and disclosure of records and information that the TSA has determined to be SSI as defined by 49 CFR Part 1520, "Protection of Sensitive Security Information". SSI is information that the TSA has determined to be detrimental to the security of Denver International Airport if disclosed to unauthorized persons. This is a process for the documentation, use, and recovery of SSI of a specific origin.

C. Applicability:

1. For all management staff, all authorized departments, all contractors, and subcontractors handling documents or materials containing SSI information.
2. Each person employed by, contracted to, or acting on behalf of the Department of Aviation at Denver International Airport is subject to the requirements of this Section.
3. SSI disclosure is limited to persons or entities under criteria identified in federal

regulations, subject to strict “need-to-know” standard, and as otherwise determined by TSA or the Department of Homeland Security (DHS).

D. Except as otherwise provided in this Section, records containing SSI are not available for public inspection or copying. Denver International Airport will not release such records to persons without a need to know. Prime contractors will not release SSI records to any subcontractor without a need to know. An employee or contractor has a “need to know” SSI if access to the information is necessary for performance of his or her official duties.

E. Unauthorized disclosure of SSI is a Federal violation of 49 CFR Part 1520 and violation is grounds for a civil penalty and other enforcement action by DHS Security. In addition to the civil penalties, corrective action may include issuance of an order requiring retrieval of SSI to remedy unauthorized disclosure, an order to cease future unauthorized disclosure, and dismissal from the work site.

F. Except as otherwise provided in writing by the TSA in the interest of public safety or airport security, the following information and records containing such information constitute SSI:

1. Information that would be detrimental to the security of Denver International Airport and aviation transportation.
2. Any performance specification, including a description of devices and procedures used by Denver International Airport, for the detection of any weapon, explosive, incendiary, or destructive substance.
3. Any performance specification, including a description of devices and procedures, for any communications equipment used by Denver International Airport in carrying out any aviation transportation security requirements.
4. Details of any security inspection or investigation of an alleged violation of aviation transportation security requirements of Federal law that could reveal security vulnerability.
5. Specific details of aviation transportation security measures including those recommended by the Federal government.
6. The following information regarding security screening under aviation transportation security requirements of Federal law:

    a. Procedures for screening of persons, property, checked baggage, U.S. mail, and cargo.
    b. Information used by a passenger or property-screening program or system, including an automated screening system.
    c. Detailed information, if determined by the TSA to be SSI, about the locations at which particular screening methods or equipment are used.
    d. Performance or test data from security equipment or screening systems.

7. Identifying information of certain aviation transportation security personnel including lists of the names or other identifying information that identify persons as having unescorted access to a secure area of the airport.
8. Critical aviation asset information identifying systems so vital to the airport that the incapacity or destruction of such assets would have a debilitating impact on

aviation security.

9. Any information involving the security of operational or administrative data systems identified by the Department of Transportation or DHS as critical to the safety or security of Denver International Airport.
10. Solicited or unsolicited proposals, pursuant to a grant or contract, to perform work that relates to security measures.

G. Restrictions on the Disclosure of SSI:

1. Employees and contractors working onsite have a duty to protect sensitive security information and must take reasonable steps to safeguard SSI in that person's possession from unauthorized disclosure. When a person is not in physical possession of SSI, the person must store it in a secure container such as a locked desk, a locked file cabinet, or in a locked room. SSI is to be disclosed only to persons having a need to know as stated in CFR 1520. Requests for SSI are to be referred to City Project Manager.
2. Prior to receiving SSI records, contractors must sign the "Confidentiality and Non-Disclosure Agreement", Form PS-17, stating that SSI will be guarded from unauthorized persons, that records will be controlled while in use and secured when not in use, and that all SSI plans and records will be returned to the airport or destroyed following the completion of the Project.
3. Return or destruction of SSI documents must be done in a timely manner and documented on the SSI Return or Destruction Compliance Form, Form PS-20. Companies under contract to the City must return or destroy all SSI material following the completion of the Work. Companies not selected during the bidding process must return or destroy all SSI material immediately following the announcement of bid results.

H. If a record containing SSI is received that is not marked as specified in this Section below, the following steps must be taken:

1. Mark the record as specified in paragraph Part 1 of this Section.
2. Inform the sender of the record that the record must be marked as specified in Part 1 of this Section.

I. If a person becomes aware that SSI has been released to unauthorized persons, promptly inform the Communication Center Supervisor at 303-342-4020 and request to speak to the on-call Airport Security Coordinator

J. Marking SSI:

1. In the case of paper records containing SSI, a covered person must mark the record by placing the PROTECTIVE MARKING conspicuously on the top, and the DISTRIBUTION LIMITATION STATEMENT on the bottom, of following parts of the document:

a. The outside of any front and back cover, including a binder cover or folder, if the document has a front and back cover.
b. Any title page
c. Each page of the document

2. Protective Marking:

    a. SENSITIVE SECURITY INFORMATION
    b. Distribution Limitation Statement:
    c. WARNING: This record contains Sensitive Security Information that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a “need to know”, as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520

3. In the case of non-paper records that contain SSI, including motion picture films, videotape recordings, audio recording, and electronic and magnetic records, a covered person must clearly and conspicuously mark the records with the protective marking and the distribution limitation statement such that the viewer or listener is reasonably likely to see or hear them when obtaining access to the contents of the record.

K. Destruction of SSI:

1. When the employee or contractor no longer needs the SSI to carry out their work requirements, the SSI must be returned to the issuing entity or completely destroyed by burning or cross-shredding to preclude recognition or reconstruction of the information.
2. The Contractor shall comply with all the requirements of the Department of Aviation Standards and Procedures, Protection of Sensitive Security Information (SSI) No. 10003 Revised 08/01/15 regarding Contractor Protection of Sensitive Security Information (SSI).

## 1.5 MISCELLANEOUS

A. Dumpster Security Requirements:

1. The following procedures must be followed to provide maximum security with all construction projects in public areas unless an exception has been made by the Airport Security Coordinator (ASC) or designee:

    a. Roll-off dumpsters must have the ability to be covered (hard side) and locked when not in use.
    b. When unlocked and in use, the Contractor shall provide an employee, or a subcontractor’s employee, to stand by the dumpster to prevent unauthorized placement of prohibited items

2. If the Contractor is not able to have a roll-off dumpster with the ability to be locked, the dumpster shall be removed from the public area when the construction site is inactive.

B. Contractor Fences (Not Perimeter Fence):

1. If required, the Contractor shall establish and maintain a secure (fenced) perimeter at its primary operations area to include its field offices, staging and storage areas, and maintenance facilities. The responsibility for security within its operations area shall rest solely with the Contractor. Entrance gates to operations areas shall be equipped with a combination of locks to include a lock provided by the City for its use in accessing emergency equipment, should that need arise. The location, size and other physical characteristics of the Contractor's operations area must be approved by the DEN Project Manager prior to its installation.
2. Unless specifically required by the Contract Documents and with the exception of the fenced operations area described above, the Contractor shall install no fences or other physical obstructions on or around the Project work area without the written approval of the DEN Project Manager.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

3.1 SUBMITTAL FOR AIRPORT ID BADGES

A. By submitting information for the individual requesting or requiring an Airport ID badge that would permit unescorted access to the Sterile and/or Secured Areas must be fingerprinted and pass a Criminal History Records Check (CHRC) and Security Threat Assessment (STA). Passing a CHRC means the employee shall not have been convicted, given a deferred sentence, found not guilty by reason of insanity or have been arrested and are awaiting judicial proceedings of any felony charge during the ten (10) years before the date of the individual’s application for unescorted access authority. For an individual to obtain driver authorization to drive within the Secured Area, the individual must have a valid driver license that allows them to drive their contractor vehicle.

B. An employee requesting an Airport ID badge must resolve all pending or valid violations before being allowed to proceed in the airport ID badging process. If the employee no longer works for the company and is attempting to be employed by a different company, a management representative from the “new” company must attend the Violation Notice Hearing along with the employee.

C. Airport ID Badges are obtained as follows:

1. The Contractor shall meet with the City Project Manager to review the procedures and required access points at DEN. The Contractor and the DEN Project Manager shall visit the site to verify the access points. Access points shall be listed and submitted by the Contractor to the DEN Project Manager for review and comment prior to Contractor’s application for badging.
2. The Contractor shall designate an Authorized Signatory who must attend an

annual class with Airport Security. The Authorized Signatory must be an employee of the Contractor, have a valid Denver International Airport ID badge. The Authorized Signatory will be authorized to sign for the Contractor on the Fingerprinting and Badge Application Form and will be the primary designation contact for Airport Security related business.

3. The Contractor's Authorized Signatory shall schedule a Participant Meeting with the DEN Airport Security Office to review DEN security procedures and receive training on how to ensure that all Participants remain in compliance with Part 20 of the Denver Municipal Airport System Rules and Regulations. A second meeting will be scheduled for the Authorized Signatory to learn how to successfully complete the required forms for Airport ID badges and vehicle permits.
4. A CHRC and STA are required for each employee requesting unescorted access to the Secure and/or Sterile Area. The employee will complete the Fingerprinting and Badge Application (two-sided form) and schedule an appointment with the Airport Security Office to have the form reviewed and to be fingerprinted. The Federal Bureau of Investigation will conduct the CHRC and will return the results to the Airport Security Office. For the fee for the Fingerprinting, please see the flydenver.com website. The Transportation Security Administration will process the STA and will return the results to the Airport Security Office.
5. When the Authorized Signatory is notified by Airport Security that the CHRC and STA have cleared, the applicants must come to the Airport Security Office to receive regulated security and driver training. The training will take approximately one (1) hour for security training and approximately two (2) hours for security and driver training.
6. All applicants must watch and pass all concepts of a computer based security training module for a Security Identification Display Area (SIDA) Airport ID badge. All individuals requesting driver authorization in the non-movement area must also view an interactive computer based driver training module and complete a test by passing all concepts. In addition, the individual must receive non-movement driver orientation training by the Contractor’s driver representative before being allowed to drive on the airfield. Non Movement Orientation training should be conducted annually.
7. All Airport ID badges must be immediately terminated upon employee separation from the Contractor or when a need for DEN access no longer exists.
8. The Airport ID badges must be returned to the Airport Security Office prior to final payment. All Airport ID badges are issued with an annual expiration date. The expiration date is determined by the birthday of the Airport ID badge holder. Contractors shall notify the DEN Project Manager as soon as possible but in no case less than four (4) weeks in advance of any requirement to extend the Sponsorship status.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **011420**

# SECTION 011430 - VEHICLE AND EQUIPMENT PERMITTING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. The Contractor shall comply with the Airport Security Program. Vehicle permits are required for all vehicles operating in the Secured Area. The DEN vehicle permit is required for vehicles operating in the Secured Area but limited to above grade, outdoor activity. Vehicles or machinery operating within buildings shall be required to acquire a DEN emissions permit as well as a DEN vehicle permit.

B. Special emphasis should be paid to Denver Municipal Airport System Rules and Regulations Part 20 – Airport Security Rules and Regulations and Part 130 – Operating Vehicles In The Secured Area" and Part 35 – Operations Infraction Accountability Program". The Denver Municipal Airport System Rules and Regulations can be found on the flydenver.com website.

1. All Work shall be accomplished in accordance with the most current FAA Advisory Circular (AC) 150/5370-2, "Operational Safety on Airports during Construction", 49 Code of Federal Regulations (CFR) Part 1542 and 14 CFR Part 139 except as modified herein.
2. All Work shall be accomplished in accordance with the most current TSA Security Directives applicable to DEN, except as modified herein.
3. Access to the runways, taxiways, and aprons shall be gained by the Contractor after establishing radio communications with Airport Operations through the DEN Inspector. No personnel or equipment will be allowed on the runways until radio contact has been made with Airport Operations and permission given.
4. Access to the Movement Area will be limited in order to allow the maximum efficient movement of aircraft. As part of this limitation, the Contractor may be required to only use these areas late at night when there is less aircraft traffic
5. Once admitted into the Secured Area, the Contractor shall proceed directly to the work location by way of a route assigned by Airport Security. At no time shall a Contractor or any of its personnel enter onto a taxiway, runway, or ramp without proper clearance from the Airport Operations Manager or Assistant Airport Operations Manager. Contractors or individuals violating these requirements for driving in the Secured Area may be subject to fines, suspension, or permanent revocation of their driver authorization and/or Airport ID badge privileges.
6. The Transportation Security Administration (TSA) requires that all operating airports be secured from the general public and has the authority to issue citations for violations of these requirements. It is the responsibility of the Airport

to ensure all fences and gates are secure. If a Contractor's operations necessitate the frequent use of a particular gate, the Contractor shall place guards at the gate. Refer to 011420 – Security Requirements and SSI for details regarding the placement of guards.

C. General Safety Regulations When in Aircraft Operations Areas May Include the Following:

1. At all times, the Contractor shall coordinate its Work with the requirements of the Airport site and operations. All Work, movement of personnel, materials, supplies and equipment in areas used by aircraft shall be subject to regulations and restrictions established by the City. The Contractor shall take special precautions and be fully responsible for the prevention of damage to materials and equipment in the areas affected by the jet blast of taxiing aircraft. No work shall proceed until necessary protective devices are placed as required to protect the public, airport operations, property, and personnel from the hazards of the Work. The Contractor shall proceed with the Contractor's Work, including temporary work and storage of tools, machinery, and materials, to cause no interference with or hazards to the operation of the Airport.
2. Landings, takeoffs, and taxiing shall take precedence over all Contractors' operations. In the event that the Contractor is notified that an emergency landing or a takeoff is imminent, the Contractor shall stop all operations immediately, regardless of the sequence of events in progress and shall immediately evacuate the Contractor's personnel and equipment from the runway and taxiway areas as directed.
3. The Contractor shall remove its personnel and equipment to the distance specified below for the prevailing conditions:

    a. For emergencies, the Contractor shall move all personnel and equipment as directed by Airport Operations or the DEN Project Manager.
    b. At the end of a work day in areas where aircraft are operating, all equipment shall be moved to a location that is not less than 750 lineal feet measured from the near edge of the runway, taxiway or ramp area or to the location designated by the City.

4. If the Contractor is asked to leave part of its work site to allow aircraft operation, the Contractor shall clean the area to allow safe aircraft movement. Cleaning may include sweeping the area to prevent damage to aircraft.

D. Vehicle Permitting:

1. Refer to the Denver Municipal Airport System Rules and Regulations Part 20 – Airport Security Rules and Regulations and Part 130 – Operating Vehicles In The Secured Area" and Part 35 – Operations Infraction Accountability Program" for information regarding vehicle permitting. These Denver Municipal Airport System Rules and Regulations can be found on the flydenver.com website.
2. For additional information regarding permitting, the Contractor must contact DEN Security.

E. Equipment Permitting

1. Fossil fuel powered equipment to be used in the interior of buildings and/or in basement/tunnel areas shall require inspection by DEN Maintenance and the Denver Fire Department.

    a. CNG fossil fuel powered equipment is preferred.
    b. If use of a gasoline, propane or diesel powered equipment is required, the contractor must comply with Denver Fire requirements for safety and firewatch including but not limited to exhaust scrubbers, confined space and OSHA requirements.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PERMITS

A. Vehicle permits shall not be issued prior to Notice to Proceed. The Contractor may, at the Contractor's own risk, submit required information prior to Notice to Proceed to the following:

1. Vehicle permit: DEN Engineering Group or DEN Airport Security.
2. Equipment and vehicle emissions permit. DEN Engineering or DEN Maintenance Group.

### 3.2 SCHEDULE

A. The Contractor shall allow in the Contractor's schedule five (5) days for DEN review and approval of submittals for permits. Testing of equipment and review by the Denver Fire Department shall be scheduled by the Contractor. By submitting information for permits, the Contractor certifies that equipment and vehicles comply with Contract documents and with all City, state and federal regulations including but not limited to emissions, licensing and safety requirements.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **011430**

# SECTION 011810 - UTILITIES INTERFACE

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. All utility requirements are set forth in the Contract Documents, including but not limited to the following locations:

B. See Article 5.4 of the Development Agreement

A. When the Contractor performs any operations that will affect a utility company, the Contractor shall give timely notice to the utility owner and the DEN Project Manager so that the Contractor's operations may be observed by the utility owner or their representative.

B. The Contractor agrees to abide by the specifications and details of the utility owner.

## PART 2 - PAYMENT

### 2.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **011810**

## SECTION 012025 - MEASUREMENT FOR PAYMENT

The Development Agreement outlines all payment mechanisms.

## SECTION 012300 – ALTERNATES

Any Alternative Technical Concepts shall be governed by Article 12.4 – Change Management Procedure, of the Development Agreement.

# SECTION 012510 – SUBSTITUTIONS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Design Standards Manual General Standards and Criteria Sections 702 and 806.

1. All formal Substitutions shall utilize this section for requests made after Issued for Construction Documents have been approved by the Building Department and not during the Design Review Process. If any substitutions are identified by the Developer before being approved by the Building Department, such substitutions shall be formally addressed during the Design Review Process

The Work specified in this Section consists of submitting form CM-09, Request for Substitution for the approval of a different material, equipment, or process than is described in the Construction Documents.

### 1.2 REFERENCE DOCUMENTS

A. Form CM-09, Request for Substitution

B. DEN Design Standards Manual General Standards and Criteria, Sections 702 and 806.

### 1.3 SUBMITTALS

A. Developer shall request acceptance for a substitution at least 30 days before the material or equipment must be ordered, utilizing form CM 09. Owner shall review and provide a response within 5 working days of receipt of the request.

## PART 2 - EXECUTION

### 2.1 SUBSTITUTION PROCESS

A. Provide the information as required on Form CM-09.

2.2 SUBSTITUTION REQUEST

A. The formal Request for Substitution will be evaluated by the DEN Project Manager 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 ability of the item or process to meet all applicable governing regulations, rules, and laws along with funding agency requirements.

Based upon the above evaluation, the DEN 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. See the DSM General Standards and Criteria for cost adjustments if applicable.

## PART 3 - MEASUREMENT

3.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 4 - PAYMENT

4.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **012510**

# SECTION 012910 - SCHEDULE OF VALUES

## PART 1 - GENERAL

1.1 See Article 13 of the Development Agreement

# SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

Refer to Technical Requirements Section I.8 related to Project Management.

# SECTION 013119 - PROJECT MEETINGS

## PART 1 - GENERAL

1.1 Refer to Development Agreement – Article 5.15.2 Meetings.

# SECTION 013210 – SCHEDULE

## Additional Information:

1.1 Development Agreement: Article 5.1.2

1.2 Technical Requirements: 1.6

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The Work specified in this Section describes the procedures and requirements for scheduling and documenting the progress of the project.
   1. Baseline Schedule
   2. Project Schedule
   3. Project Schedule Updates
   4. Recovery Schedule
   5. Special Schedules (No process or requirements provided. As required):
      a. Transition and Phasing Plan schedules
      b. Three week look ahead schedules
      c. Weather impacts and mitigations
      d. Recovery schedule and alternatives

B. Reference Documents
   1. Section 011100 "Summary of Work"
   2. Section 011420 "Work Sequence and Constraints".
   3. Section 012910 "Schedule of Values".
   4. Section 013119 “Project Meetings”
   5. Section 013300 "Submittal Procedures"

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a Project Schedule consume time and resources:

   1. Critical Activity: An activity on the critical path that must start and finish on the

planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based upon defined relationships. Defined relationships determine when activities can be performed and the critical path for completing the Work.

C. Critical Path: The longest chain of interdependent activities through the network sequence that establishes the shortest duration for completing the work and contains no float. The critical path shall be calculated as total float equal to but not less than zero days.

D. Float: The amount of time that an activity in a network sequence can be delayed without causing a delay to subsequent activities and/or the completion date of the Work:

1. Float is not for the exclusive use or benefit of either the Owner or the Developer/Contractor but is jointly owned. Liability for delay to the completion of the Work rests with the party whose actions, last in time, actually causing a delay to the completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of its successor activity.
3. Total float is the amount of time that an activity may be delayed from early start without adversely affecting the completion date.

E. Work Breakdown Structure (WBS): A hierarchical arrangement of the activities that allows for the roll-up and summarization to a predetermined level. The Owner's shall have the right to add some activities that affect critical delivery or performance coordination dates.

## 1.4 SUBMITTALS

A. Scheduler Qualifications

1. Scheduling Consultant Qualifications: A professional specialist, experienced in CPM scheduling and reporting with capability of producing CPM reports and diagrams. Review methods and procedures related to the set-up in the Baseline Schedule and Project Schedules, including, but not limited to, the following:

a. Review content and format for reports.
b. Verify availability of qualified personnel needed to develop and update schedule.
c. Discuss constraints, including phasing, area separations, interim milestones, and potential partial Owner occupancy.
d. Review delivery dates for Owner-furnished products.
e. Review submittal requirements and procedures.
f. Review time required for review of submittals and resubmittals.

g. Review requirements for tests and inspections by independent testing and inspecting agencies.
h. Review time required for Project closeout and Owner transitioning, including commissioning activities.
i. Review procedures for updating schedule.
j. Review requirements for content and input of direct man-hour resources in activities.
k. Review requirements for cost loading of activities.

B. Format for Submittals: All schedules shall be submitted in the following format:

1. The Contractor shall develop Critical Path Method (CPM) Schedule(s). The schedule shall utilize the Precedence Diagram Method (PDM) and be depicted in a Gantt Chart view.
2. All Project Schedules shall be submitted to the Owner's Project Manager electronically in Primavera P6 XER and PDF format that enables the fields, rows, and columns to be expanded, as required. Additionally, the PDF format used must allow import/export, manipulation, and generation of reports to evaluate and review any part of the schedule.
3. Export file shall use a naming convention that indicates the Project name, Schedule type/purpose, Data Date and Run Date.

4. All schedules shall contain a title block showing:

a. Project name.
b. Contractor number.
c. Contractor's name.
d. Data date.
e. Symbol legend.

5. All schedules shall contain a time-scale at the top showing month and weeks.
6. The activity table layout shall include, but not limited to, the following columns:

a. Activity ID.
b. Activity name.
c. Original duration.
d. Schedule percent complete.
e. Start date
f. Finish date
g. Total Float.

7. A narrative report shall accompany all schedules to explain if:
a. Developer is seeking a time extension and/or compensation.
b. Developer is reflecting Critical Path tasks that require Owner's action(s)
c. Developer is reflecting a change to Baseline Project Schedule (as approved by Owner)

8. A mitigation report shall be required when at the discretion of either party it

becomes apparent that the project is not progressing on time regardless of the cause of delays and impacts, or issued construction changes have negative impact and require a mitigation effort through several viable alternatives. The mitigation report shall detail the measures proposed by the Developer to mitigate the impacts of the delay in order to meet the planned project completion date.

1.5 BASELINE PROJECT SCHEDULE:

A. The Baseline Project Schedule shall comply with Format for Submittals

B. The Contractor shall submit the updated Baseline Project Schedule ten (10) days after the Notice to Proceed 1 (NTP1) and/or Development Agreement Effective Date, whichever comes first, reflecting the Development Agreement Appendix 3 Baseline Project Schedule, populated with proposed calendar days for all activities. Upon review by the Owner's Project Manager and agreed upon modifications implemented, the Baseline Project Schedule shall become the basis for the level of detail for the initial Project Schedule and subsequent Project Schedule updates for the duration of the project.

C. The Baseline Project Schedule shall include Design and Construction activities as identified in the Agreement.

D. Preparation
   a. Indicate each significant design and construction activities separately.
   b. Identify first work day of each week with a continuous vertical line.

E. The Owner's Project Manager will respond within 7 days to the Baseline Project Schedule submittal (utilizing the updated Baseline Schedule referenced in Part 1.5.B) with either acceptance or direction to modify in order to meet compliance.

1.6 PROJECT SCHEDULE

A. The Contractor shall submit the initial Project Schedule thirty (30) days after the Notice to Proceed 1 (NTP1). Upon acceptance from the Owner's Project Manager, the initial Project Schedule shall become the basis for tasks related to the Phased Construction work.

B. The Owner's Project Manager will respond within 7 days with comments or direction to modify if the Project Schedule is not in compliance to the stated requirements.

C. The acceptance of the schedule is for general conformity to the Contract requirements.

D. The Project Schedule will serve as the basis for the Schedule of Values activities.

E. 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 Owner's review and/or acceptance of the schedule.

F. Preparation:

1. Project Duration

    a. Extend the schedule timeline(s) from date of established NTP's and/or construction commencement dates to the Turnover Date Functional Area Readiness dates for each phase and Project Final Acceptance at the final phase.
    b. Contract completion date shall not be changed by submission of a schedule that shows an earlier completion date, unless specifically amended by Change Order.

2. Activities

    a. The Project Schedule(s) shall include Design and Construction activities in addition to the activities identified in the Baseline Project Schedule.

    b. Treat each building floor or separate area as a separate numbered activity for each main element of the Work. Prepare a list of all activities required to complete the Work and indicate the estimated time duration, sequence requirements, and relationships of each activity in relation to the other activities.

3. Activity Duration:

    a. Define activities so no construction activity is longer than thirty (30) calendar days, unless specifically allowed by Owner's Project Manager. Include estimated time frames for the following activities:
        1) Preparation and processing of submittals identified, in accordance with the Technical Requirements.
        2) Mobilization and demobilization.
        3) Long lead procurements
        4) Anticipated System shutdown request and approval
        5) Utility/system interruptions
        6) Startup, Testing and Commissioning
        7) Punch list and Final Acceptance.

4. Critical Path Activities:
    a. Identify critical path activities, including those for interim completion dates.
    b. Scheduled start and completion dates shall be consistent with Agreement milestone dates.

5. Procurement Activities:

    a. Include procurement activities for long lead items and major items as separate activities in schedule.

6. Constraints:

    a. Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1) Phasing:

a. Arrange list of activities in schedule by phase or Work Breakdown Structure (WBS).
b. Coordinate phasing and constraint with those established in Technical Specification Section 011400 “Work Sequence and Constraints”.

2) Owner-furnished and Owner-furnished/installed products:

a. Include separate activity for each product.
b. Include delivery date indicated in Technical Specification Section 011100 “Summary of Work” and or forecasted by Developer.
c. Delivery dates indicated stipulate the earliest possible delivery date.

7. Milestones:

a. Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the NTP’s, phasing requirements, Substantial Completion and Final Acceptance.

b. Change Order:

a. For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change to the overall project schedule.

## 1.7 PROJECT SCHEDULE MONTHLY UPDATES

A. The Contractor shall submit a monthly progress schedule (Project Schedule with comparison to Baseline) at the end of each month following NTP1. At the end of each month, the Contractor and Owner’s Project Manager shall agree on the progress of the work and the Contractor shall update the Project Schedule accordingly.

B. Concurrent with making revision to the schedule, prepare a tabulated report showing the following and include in the narrative report:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations for remaining work activities only.
5. Changes in critical path.
6. Change in total float.
7. Changes in contract duration.

C. Changes to the Schedule:
1. The Project Schedule critical path may be changed when one or more of the following events occur:

a. When a Change Order significantly affects the contract completion date or sequence of work.
b. When the Contractor elects to change the sequence or duration of work items affecting the critical path and the Owner has approved
c. When the Owner directs a change that affects a milestone dates specified in the Special Conditions or alters the length of a critical path.

2. Minor revisions submitted at monthly progress review meeting are not considered as changes in this context.

1.8 AS-BUILT PROJECT SCHEDULE:

A. After all Contract Work items are complete, the Developer shall submit an as-built Project Schedule showing actual start and finish dates for all work items and milestones.

1.9 SUBCONTRACTOR COORDINATION

A. The Developer shall schedule and coordinate the work of all of its subcontractors and suppliers including their use of the Work Site.

B. The Developer shall keep the subcontractors and suppliers informed of the Project Schedule to enable the subcontractors to plan and perform their work properly.

1.10 RECOVERY SCHEDULE

A. If the latest completion time date for any work item does not fall within the time allowed by the Baseline and/or Project Schedule(s), the sequence of work or duration shall be revised by the Developer 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.

B. No additional costs will be allowed if such expediting measures are necessary to meet the agreed completion date or dates except as provided elsewhere in the Development Agreement.

C. When periodic update indicates the Work is behind the current approved schedule, submit a separate Recovery Schedule indicating means by which Developer intends to regain compliance with the schedule.

D. Provide a narrative indicating changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished. The narrative shall be submitted in accordance with the Development Agreement.

## 1.11 COORDINATION

A. Pre-scheduling Conference: Schedule a conference after NTP1 to review the Baseline Schedule and the initial Project Schedule development and reporting criteria, including, but not limited to, the following:
   1. Review content and format for reports.
   2. Verify availability of qualified personnel needed to develop and update schedule.
   3. Discuss constraints, including phasing, area separations, interim milestones, and partial Owner occupancy.
   4. Review delivery dates for Owner-furnished products.
   5. Review submittal requirements and procedures.
   6. Review time required for review of submittals and resubmittals.
   7. Review time required for Shutdown request and approval.
   8. Review requirements for tests and inspections by independent testing and inspecting agencies.
   9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
   10. Review procedures for updating schedule.
   11. Review requirements for content and input of direct man-hour resources in activities.
   12. Review requirements for cost loading of activities.

B. Secure time commitments for performing critical elements of the Work from entities involved.

C. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 013200

# SECTION 013223 - CONSTRUCTION LAYOUT, AS-BUILT AND QUANTITY SURVEYS

## ADDITIONAL INFORMATION:

- See DSM General Standards and Criteria, Chapter 26

# SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final Completion construction photographs.

### 1.3 INFORMATIONAL SUBMITTALS

A. Digital Photographs: Upload image files within 5 working days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 6 megapixels.
2. File Format: JPG, in unaltered original files, with same aspect ratio as the sensor, date stamped, in folder named by date of photograph,
3. Identification: Provide the following information with each image description in file metadata tag:
    a. Date photograph was taken.
    b. Description of location,

B. Construction Photographs:

a. Submit digital photographs of a minimum of 4 common vantage point photographic views every week.

b. Submit digital photographs of construction progress on a weekly basis, collected in separate weekly files.

c. Submit professional digital photographs every other month for Owner promotional/public information use.

1. Format: See above.
2. Identification: See above

1.4 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to City and County of Denver for unlimited reproduction of photographic documentation.

## PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 6 megapixels.

## PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to show clearly the Work. Photographs with blurry or out-of-focus areas will not be accepted.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software. Provide commercial quality, digital color photographs in JPG format. JPG file shall be security-free, bookmarked by date. Identify the following information on each digital electronic photograph file.
   1. Date each photo was taken
   2. Photograph number
   3. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to DEN Project Manager.

C. Preconstruction Photographs: Take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, to full cover the existing conditions within each Construction Phase and of each Functional Area, especially areas that will not be altered or improved, as well as match points of construction finishes/systems.
   1. Take photographs to show existing conditions adjacent to property before starting the Work.
   2. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
   3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
   4. Haul route, laydown yard, and other locations as directed by DEN Project Manager.

D. Time-Lapse Sequence Construction Photographs: Take weekly photographs as indicated (1.3 B), to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs weekly
2. Vantage Points: Following suggestions by DEN Project Manager and Developer, photographer to select vantage points. During each of the following construction phases, take the required shots from same vantage point each time.

E. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents. DEN Project Manager will inform photographer of desired vantage points.

1. Do not include date stamp.

F. Additional Photographs: DEN Project Manager may request photographs in addition to periodic photographs specified. Additional photographs shall be paid for by Change Order and are not included in the Contract Sum.

1. Three days' notice shall be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

    a. Special events planned at Project site.
    b. Immediate follow-up when on-site events result in construction damage or losses.
    c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    d. Substantial Completion of a major phase or component of the Work.
    e. Extra record photographs at time of final acceptance.
    f. DEN's request for special publicity photographs.

END OF SECTION **013233**

## SECTION 013300 - SUBMITTAL PROCEDURES

**Additional Information:**

- Development Agreement: Article 4.4, “Submittals”
- Technical Requirements: I.8.3, “Submittal and Review Requirements” and
- DSM General Standards and Criteria, Chapter 32

END OF SECTION **013300**

# SECTION 013325 - SHOP AND WORKING DRAWINGS, PRODUCT DATA, AND SAMPLES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. See 013300 – Submittal Procedures, for submittal requirements related to this section.

B. Provide submittals to Owner for approval for Technical Specifications Sections 087100, 230923, 275114 and 283100.

END OF SECTION **013325**

## SECTION 013510 - CONSTRUCTION SAFETY

## PART 1 - GENERAL

1.1 All Construction Safety requirements will be set forth in:

- **a.** Technical Requirements I.9 and I.10,
- **b.** Section 013520,
- **c.** DEN Rules and Regulations, and
- **d.** ROCIP Safety Manual. (as applicable)

END OF SECTION 013510

# SECTION 013516 - ALTERATION PROJECT PROCEDURES

## PART 1 - GENERAL

### 1.1 SUMMARY

A. This project is a renovation project; therefore, any alterations will be covered in the Contract Documents.

### 1.2 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 or uncovered during the Work, regardless of whether they were previously documented, remain the City's property.

END OF SECTION **013516**

# SECTION 013520 - CONSTRUCTION SAFETY - AIRSIDE

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Work specified in this Section includes construction safety precautions and programs by the Contractor for airside, and the basis for reviews by the DEN Project Manager.

B. Related Specification Sections:

1. Section 011420 "Security Requirements and Sensitive Security Information".
2. Section 011430 "Vehicle and Equipment Permitting".
3. Section 011810 "Utilities Interface".
4. Section 013510 "Construction Safety".

C. For projects enrolled under DEN Rolling Owner Controlled Insurance Program (ROCIP) reference the Contract Special Conditions for all safety requirements.

D. For projects enrolled under DEN Owner Controlled Insurance Program (OCIP) reference the Contract Special Conditions for all safety requirements.

### 1.3 RESPONSIBILITY

A. The Contractor is responsible for the health and safety of the Contractor's personnel, agents, subcontractors and their personnel, 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.

B. This Section shall be interpreted in its broadest sense for the protection of persons and property by the Contractor and no action or omission by the DEN Project Manager or the DEN Project Manager's authorized representatives shall relieve the Contractor of any of its obligations and duties hereunder.

### 1.4 SUBMITTALS

A. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for the submittal process. The

Contractor's Health and Safety Plan (HSE)shall be submitted and approved prior to commencing any Work. If a Task Order or Change Order is issued where the Work is not covered by the approved Contractor's Health and Safety Plan, then a revision to the Safety Plan specific for the Work in the Task Order shall be resubmitted for approval.

1. No progress payment shall be approved until the Contractor's Health and Safety Plan has been accepted by the DEN Project Manager.

B. Scope: The Contractor’s Health andSafety Plan shall be developed and submitted by the contractor for the DEN Project Manager’s review and approval. The Health and Safety Plan shall be developed according to the guidelines and requirements provided in FAA AC No. 150/5370-2F "Operational Safety on Airports During Construction. The Health and Safety Plan shall cover the actions of not only the construction personnel and equipment, but the actions of inspection personnel and airport staff for the duration of construction activities.

C. Definitions:

1. Approach Surface: A surface longitudinally centered on the extended runway centerline and extending outward and upward from either a runway threshold or 200 feet behind a threshold. This surface is needed to define where unobstructed airspace above the runway begins.
2. Notice To Airmen (NOTAM): A notice to the flying public (airmen) through FAA’s NOTAM system. Normally initiated by message to the nearest FAA Flight Service Station. Issuance of the NOTAM will be coordinated through the DEN Project Manager and DEN Operations.
3. Object Free Area: A two-dimensional ground area surrounding runways, taxiways, and taxi lanes that is clear of objects, except for objects whose location is fixed by function.
4. Safety Area (see AC 150/5300-13A): A defined surface adjacent to runways, taxiways and taxi lanes prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot or excursion from the paved surface. Each safety area must be cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations. Each safety area must be drained by grading or storm sewers to prevent water accumulation. East safety area must be capable under dry conditions of supporting snow removal and aircraft rescue and firefighting equipment and or supporting the occasional passage of aircraft without causing any damage to the aircraft. No objects may be located in any safety area, except for objects that need to be located in a safety area because of their function. These objects must be constructed, to the extent practical, on frangibly mounted structures of the lowest practical height, with the frangible point no higher than three (3) inches above grade.

D. Policy: Aviation safety is a primary consideration during airport construction. These activities shall be planned and scheduled to minimize disruption of normal aircraft activities. If the clearances and restrictions described in this plan cannot be maintained while construction is underway, action will be taken by the Contractor to perform Work at night or during periods of minimal aircraft activity.

E. Safety Impacts: The Contractor shall take all necessary steps and precautions to mitigate the impact of hazardous conditions as they may relate to the Work. Potentially hazardous conditions which may occur during airport construction include, but are not limited to, the following:

1. Trenches, holes, or excavations on or adjacent to any active runway, taxiway, taxi lane, apron, or related safety areas.
2. Unmarked/unlighted holes or excavations on or adjacent to any active runway, taxiway, taxi lane, apron, or related safety areas.
3. Mounds or piles of earth, construction material, temporary structures, or other objects on or in the vicinity of any active runway, taxiway, taxi lane, apron or related safety, approach, or departure areas.
4. Pavement drop-offs that would cause, if crossed at normal operating speeds, damage to aircraft that normally use the airport. The maximum drop-off is 3 inches per FAA AC 150/5300-13A.
5. Vehicles or equipment (whether operating or idle) on any active runway, taxiway, taxi lane, apron or related safety, approach, or departure areas.
6. Vehicles, equipment, excavations, stockpiles, or other materials that could impinge upon NAVAID-critical areas and degrade or otherwise interfere with electronic NAVAIDS or interfere with visual NAVAIDS facilities.
7. Unmarked utility, NAVAIDS, weather service, runway lighting, underground power, or signal cables that could be damaged during construction.
8. Objects or activities anywhere on or in the vicinity of an airport which would be distracting, confusing, or alarming to pilots during aircraft operations.
9. Unflagged/unlighted low visibility items such as tall cranes, backhoes, scrapers, dump trucks, rollers, compactors, dozers and the ilk, in the vicinity of an active runway, taxiway, taxi lane, apron or related safety, approach, or departure areas.
10. Dirt, debris, or other transient accumulations that temporarily obscure pavement markings or pavement edges, or derogate the visibility of runway or taxiway markings or lighting or of construction and maintenance areas.
11. Trash or other materials with foreign object damage (FOD) potential, whether on runways, taxiways, taxi lanes, aprons or in related safety areas.
12. Failure to control vehicle, human and large animal access to, and nonessential non-aeronautical activities on, open aircraft movement areas.
13. Failure to maintain radio communication between construction vehicles and air traffic control or other on-field communications facilities.
14. Construction activities or material which could hamper Aircraft Rescue and Fire Fighting (ARFF) vehicle access from ARFF stations to all parts of the runway/taxiway system, runway approach and departure areas, or aircraft parking locations.
15. Inadequate fencing or other marking to separate construction areas from open aircraft operating areas.
16. Bird attractions such as edibles (food scraps, etc.), trees, brush, other trash, grass/crop seeding, or ponded water on or near the airport.

F. Safety Requirements:

1. General:

a. During performance of this Contract, the airport runways, taxiways, taxi

lanes, and aircraft parking aprons shall remain in use by aircraft to the maximum extent possible, consistent with continual safety. Aircraft use of areas near the Contractor's Work will be controlled to minimize disturbance to the Contractor's operation. However, AIRCRAFT HAVE THE RIGHT OF WAY AT ALL TIMES. The Contractor shall not allow employees, subcontractors, suppliers, or any unauthorized persons to enter or remain in any airport area that would be hazardous to persons or to aircraft operations.

b. Contractor personnel, airport staff and field inspectors directly involved in on-airport construction shall:

    1) Be aware of the types of conditions, safety problems, and/or hazards identified each day at the airport. To insure that all personnel are aware, daily meetings between management and supervisory personnel and their employees shall be scheduled prior to any work commencing on the shift.
    2) Inspect daily all work and/or storage areas for which the Contractor is responsible to be aware of current conditions.
    3) Promptly take all steps needed to remedy any unsafe or potentially unsafe condition. Coordinate with the DEN Project Manager to insure immediate corrective action is undertaken

c. Before commencement of construction activity the Contractor, through coordination with the DEN Project Manager and DEN Operations, shall give notice using the NOTAM system of construction on the airfield. In addition, a NOTAM shall be issued for the completion of construction on the airfield.

2. Construction Area Marking: Temporary lighting, barricades, flagging, and flashers are required as shown on the plans and per FAA AC 150/5370-2F Chapter 2 Section 220.b.(1)(2) Flag lines, traffic cones, flashers, edge lights, and/or signs shall be used as necessary:

    a. To clearly separate all construction from other parts of an air operations area
    b. To identify isolated hazards, such as open manholes, excavations, areas under repair, stockpiled material, waste areas, etc.
    c. Vehicle and pedestrian access routes used for airport construction shall be controlled to prevent any unauthorized entry of persons, vehicles, or animals.
    d. Vehicle parking areas for Contractor employees shall be designated in advance to minimize traffic in open/active aircraft movement areas.

3. Cables and Utilities:

    a. Special attention shall be given to preventing unscheduled interruption of utility services and facilities. The location of all cables and utilities shall be identified prior to construction activities.
    b. There shall be coordination among the Contractor, the DEN Project Manager, DEN Operations, the FAA, the National Weather Service, utility companies, and any other appropriate entity or organization. NAVAIDS,

weather service facilities, electric cables, and other utilities must be fully protected during the entire construction time.

c. Power, communication, and control cables leading to and from any FAA NAVAIDS, weather service, and other facilities will be marked in the field by the appropriate individuals as identified in Section 011810 "Utilities Interface" for the information of the Contractor before any work in their general vicinity is started. Thereafter, through the entire duration of construction, utilities shall be protected from any possible damage.

d. At the intersection of expansion joints and centerline lighting circuits on taxiways and runways, the electrical conduit may be within the 21” portion of the Portland cement concrete pavement. Coordination with the DEN Project Manager’s representative and the DEN Electrical Department is of utmost importance for both the scheduling of an outage and the removal of conductors while cutting the joint.

4. Vehicle and Employee Identification:

a. Contractor vehicles and equipment shall be flagged for high daytime visibility and if appropriate, lighted for nighttime operations. Vehicles that are not marked and lighted shall be escorted by a vehicle that is equipped with appropriate marking and lighting devices. Marking and lighting shall be in conformance with FAA AC 150/5210-5D, current edition, or as outlined in Section 011430 "Vehicle and Equipment Permitting" of the Contract Documents.

b. The Contractor will be required to conform to the specific requirements as outlined in Section 011420 "Security Requirements and Sensitive Security Information (SSI)" of the Contract documents.

5. Radio Communications:

a. The Contractor’s construction superintendent and flag personnel shall be required to coordinate directly with the DEN Project Manager or designated Representative. Only the DEN Project Manager or designated Representative shall monitor transceiver radios tuned to the frequency for communications with DEN Operations and B Tower Control. Radios shall be used to obtain the proper clearance concerning the movement of equipment, trucks, etc., on the airfield. Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

6. Haul Routes Crossing Active Aircraft Operation Areas:

a. The Contractor shall provide a minimum of one (1) broom truck to continuously clean the surface of the active taxiway, taxi lane or apron of any foreign object damage (FOD) or other objectionable debris that may result from hauling activities. Additional broom trucks may be required to expedite the cleanup process. Opening the taxiway, taxi lane, or apron to aircraft operations shall only be approved after a visual inspection of the pavement surface by the DEN Airfield Operations Manager.

b. The Contractor shall not work within the minimum of the following: 160 ft. of the centerline of an active taxiway, 310 ft. of the centerline of an active runway, or the minimum requirements of the FOD or Safety Zone unless otherwise noted in the Contract Documents and as approved in writing by the DEN Project Manager.

c. All construction equipment and vehicles shall be flagged for high daytime visibility and if appropriate, lighted for nighttime operations. Vehicles that are not marked and lighted shall be escorted by a vehicle that is equipped with appropriate marking and lighting devices. Marking and lighting shall be in conformance with FAA AC 150/5210-5D, current edition.

d. All Contractor and Subcontractor employees must be aware of the types of safety problems and hazards associated with aircraft operations and construction activities.

## PART 2 - PRODUCTS

2.1 Contractor's Health and Safety Plan

A. The Contractor shall provide six (6) copies of the Contractor’s Health and Safety Plan to the DEN Project Manager for review at least ten (10) calendar days before on-site construction begins. The Contractor's program must meet, as a minimum, all applicable federal, state and local government requirements, and the following:

1. The Contractor shall provide the following information for acceptance by the DEN Project Manager prior to the commencement of construction activities. The Health and Safety Plan must address all aspects listed below. If an item is not applicable, then this must be noted in the plan.

a. Name of the Contractor's safety representative.

b. If the Contractor is running multiple shifts or working more than (40) hours per week, the name of an assistant safety representative who can act in the absence of the site safety representative.

c. Twenty-four (24) hours per day emergency phone numbers of Contractor site management to be used in case of injury or accident. Provide at least four contacts.

d. Means of protecting employees working in trenches and excavations, including sloping and shielding.

1) Soil classification will be considered as Type C when designing protective systems, unless the Contractor can prove to the satisfaction of DEN that the soil classification is otherwise. Soil classification change request shall be provided to the DEN Project Manager in writing. The decision of the DEN Project Manager will be provided to the Contractor in writing.

e. The Contractor shall show how material shall be stored beside the excavation. Stored material shall include the excavated and backfilled material

f. Injury and accident handling, including samples of the reporting form.
g. How personnel will be handled who are unable to safely perform their duties, including how the Contractor will determine whether personnel are unable to safely perform duties. This may include the Contractor's disciplinary process and employee's physical capabilities to perform the work safely.
h. How and when equipment will be checked to see that it is safe, that all safety guards are in place, and that the equipment is being used for its designed purpose and within its rated capacity.
i. How and when all electric devices will be checked for proper grounding and insulation. Describe the methods that will be used to lock out electric systems that should not be energized.
j. How trash and human organic waste will be disposed of.
k. How snow and ice will be removed by the Contractor in the project area.
l. How concrete forms will be anchored to ensure their stability, including calculations showing that the forms will safely hold the maximum construction loads.
m. How flammable materials will be stored and handled, and how any spills will be cleaned up and removed for disposal.
n. What system will be used to prevent fires and, if fires do occur, who will be trained to fight them. In addition, what firefighting equipment will the Contractor have available and how will this equipment's condition be monitored.
o. How materials will be received, unloaded, stored, moved, and disposed of.
p. How personnel working above ground level will be protected from falling.
q. How people working beneath the construction work will be protected.
r. What will be done to protect personnel in case of severe weather.
s. How adequate lighting will be provided and monitored.
t. How air quality will be monitored to ensure that chemical exposures are below current, established OSHA Permissible Exposure Limits. How personnel will be protected if these limits are exceeded.
u. How the safety of work platforms, man lifts, material lifts, ladders, shoring, scaffolding, etc., will be ensured relating to load capacity and the protection of personnel using or working around them.
v. The type of personal protective equipment that will be used to protect personnel from hazards.
w. The type of safety training that will be provided to personnel to inform them of safe work procedures.
x. How daily audits and inspections will be performed to ensure compliance with the Contractor's Operational Safety Plan and current, applicable OSHA regulations.
y. Procedures to ensure that welding and other hot work is performed safely.

    1) A hot work permit from the Denver Fire Department (DFD) will be required for all welding, soldering, cutting, and brazing and or other processes required by DFD on the project. Contractor will comply with all of the provisions in the permit.

z. How compressed gases will be safely stored, handled, and used.
aa. Methods to ensure that personnel safely enter, work in, and exit confined

spaces.

1) All confined spaces on DEN property are considered permit required. A permit must be obtained from the DFD before Contractor personnel may enter a confined space. Contractors will comply with all provisions and requirements of this permit.

bb. How the hazards of chemicals will be communicated to personnel, including the use of material safety data sheets and chemical labels.
cc. Methods to ensure that forklifts and other powered industrial trucks are operated in a safe manner.
dd. How an effective hearing conservation program will be used to protect personnel from high noise levels and prevent hearing loss.
ee. How personnel will be protected from the effects of jet blast.
ff. How hazards will be identified and corrected when reported.

2.2 DEN PROJECT MANAGER'S REVIEW

A. Prior to the start of any work by contractor or subcontractor personnel, the Contractor shall provide the DEN Project Manager with a list of its personnel, subcontractor's personnel and other personnel the Contractor has requested to work at Denver International Airport, who have signified in writing that they have been briefed on, or have read and understand, the Contractor's Health and Safety Plan.

## PART 3 - EXECUTION

3.1 IMPLEMENT CONTRACTOR'S OPERATIONAL SAFETY PLAN

A. Implement the approved Contractor's Health and Safety Plan as described in Part 1 and Part 2 of this Section and in Section 011100 "Summary of Work."

B. If the Contractor experiences lost time or an injury rate greater than 75 percent of the national average for all construction, the Contractor shall notify the DEN Project Manager, audit its safety procedures, and submit a plan to reduce its rates.

C. If at any time the lost time or injury rates experienced by the Contractor are 150 percent or more of the national average for construction, the Contractor shall notify the DEN Project Manager and immediately hire an independent safety professional who shall audit the Contractor's procedures and operations and make a report of changes that the Contractor should implement to reduce the rate including changing personnel.

1. The report shall be submitted to the DEN Project Manager.
2. The Contractor shall immediately begin implementing the recommendations of the independent safety professional.
3. A weekly report shall be submitted by the Contractor to the DEN Project Manager on the status of the implementation of the recommendations.
4. Failure to comply with these requirements is a basis to withhold a portion of progress payments.

3.2 ROLLING OWNER CONTROLLED INSURANCE PROGRAM (ROCIP)

A. Implement Rolling Owner Controlled Insurance Program (ROCIP) as provided in the Project Manual issued for bid or proposal as directed by the Owner.

3.3 OWNER CONTROLLED INSURANCE PROGRAM (OCIP)

A. Implement Owner Controlled Insurance Program (OCIP) as provided in the Project Manual issued for bid or proposal as directed by the Owner.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **013520**

# SECTION 014100 - REGULATORY REQUIREMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contract Documents.

### 1.2 SUMMARY

A. This Section identifies primary compliance with the State, City and County of Denver's regulatory requirements including:

1. City and County of Denver / Department of Aviation.
2. Colorado Department of Public Health and Environment.
3. City and County of Denver Development Services, including the Department of Public Works and Division of Wastewater Management.
4. The standards that govern design and construction of this project are set forth in the Contract Documents.

B. Construction shall be based on the latest edition of the referenced codes including additions and revisions thereto that are in effect at the time of the Effective Date of Development Agreement as listed below:

Federal requirements;

- *2010* **ADA Standards for Accessible Design**

State of Colorado requirements;

- *2015* **International Building Code** With amendments
- *2015* **International Energy Conservation Code**
- *2003* **ICC/ANSI A117.1; Accessible and Usable Buildings and Facilities**
- *2015* **International Existing Building Code.**
- *2015* **International Mechanical Code**
- *2015* **International Plumbing Code**
- *2015* **International Fuel and Gas Code**
- *2015* **International Energy Code (IECC)**
- *2014* **National Electrical Code (or NEC version currently adopted by the State of Colorado)**

City & County of Denver requirements;

- *2016* **Denver Building and Fire Code**
- *2015* **International Fire Code**
- *2015* **International Building Code**
- *2015* **International Existing Building Code**
- *2015* **International Energy Conservation Code**

- *2013* **NFPA-145: Standard on Airport Terminal Buildings**
- ***NFPA-130: Standard for Fixed Guideway Transit and Passenger Rail Systems*** This is not a requirement by Denver, but we are attempting to convince them to grant us the use of this Standard.

DEN requirements;

- *2016* **DEN Design Standards Manuals:**
  - **DSM General Standards and Criteria**
  - **DSM BIM**
  - **DSM Life and Safety**
- **LEED 2009 Commercial Interiors.**

## 1.3 RELATED SECTIONS

1. Section 015719 "Temporary Environmental Controls" for environmental and related permitting requirements.

## 1.4 BUILDING CODE

All design and construction work shall be governed by the Building Code for the City and County of Denver, which means the Building Code, Policies, and Guides in effect at the time of the Effective Date of Development Agreement. )

## 1.5 DENVER BUILDING DEPARTMENT

A. For review and approval of all construction documents for compliance to the Denver building code:

City and County of Denver
Denver Development Services
201 West Colfax Avenue, Dept. 205
Denver, Colorado 80202
Telephone 720-865-2790
Fax 720-865-3020
developementservices@denvergov.org

## 1.6 DENVER FIRE DEPARTMENT

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

Denver Fire Department
745 West Colfax Avenue
Denver, Colorado 80204
Telephone 720-913-3474

B. 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 done in accordance with the Development Agreement. 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 aboveground storage tanks (AST) and underground storage tanks (UST) for both temporary tanks and permanent facility installations.

C. 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 Uniform Fire Code requirements may be enforced. These should be addressed with the Denver Fire Department before construction begins and during construction with premise inspection(s).

1. The Fire Prevention Bureau web site is denfpb@denvergov.org

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 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 completion of any inspection by other agencies, the Contractor shall forward copies of the status of the inspection and copies of any approved or "signed-off" inspections by the respective agencies to the DEN Project Manager.

C. At the time of request for Construction Substantial Completion, the Contractor shall forward to the DEN Project Manager all permits approved by the respective agencies.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **014100**

# SECTION 014220 - ABBREVIATIONS AND SYMBOLS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 REFERENCE LIST

A. Documents published by the following agencies may be referenced within these Contract Documents to define the quality of materials, equipment, workmanship, and other features of Work. Unless otherwise stated, the reference documents shall be of the latest edition as of the date of the Effective Date of the Development Agreement.

B. Wherever used in the Contract Documents, the following abbreviations will have the meanings listed:

| Abbreviation | Definition |
|---|---|
| AALA | American Association of Laboratory Accreditation |
| AAN | American Association of Nurserymen |
| AAO | Affirmative Action Officer |
| AASHTO | American Association of State Highway and Transportation Officials |
| ACI | American Concrete Institute |
| ADA | Americans with Disabilities Act |
| AFI | Air-Filter Institute |
| AGTS | Automated Ground Transportation System |
| AIA | American Institute of Architects |
| AISC | American Institute of Steel Construction |
| AISI | American Iron and Steel Institute |
| AITC | American Institute of Timber Construction |
| AMCA | Air Moving and Conditioning Association |
| ANSI | American National Standards Institute, Inc. |
| APA | American Plywood Association |
| APEN | Air Pollution Emission Notes |
| APWA | American Public Works Association |
| ARI | Air Conditioning and Refrigeration Institute |
| ASCE | American Society of Civil Engineers |

| Abbreviation | Definition |
|---|---|
| ASHRAE | American Society of Heating, Refrigeration, and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASNT | American Society for Non-Destructive Testing |
| ASPE | American Society of Plumbing Engineers |
| ASSE | American Society of Sanitary Engineering |
| ASTM | American Society for Testing and Materials |
| AWPA | American Wood Preserver's Association |
| AWS | American Welding Society |
| AWWA | American Water Works Association |
| BID | Building Inspection Division, Department of Public Works |
| BIM | Building Information Modeling |
| CAR | Corrective Action Report |
| CCD | City and County of Denver |
| CCR | Contractor Change Request |
| CCRL | Cement Concrete Reference Laboratory |
| CD | Change Directive |
| CDOH | Colorado Department of Highways or Colorado Department of Health |
| CDOT | Colorado Department of Transportation |
| CMEC | Concrete Materials Engineering Council |
| CN | Change Notice |
| CO | Change Order |
| COE | Corps of Engineers |
| CPM | Critical Path Method |
| CR | Change Request |
| CRSI | Concrete Reinforcing Steel Institute |
| CSI | Construction Specifications Institute |
| DEN | Denver International Airport |
| DFD | Denver Fire Department |
| DOT | United States Department of Transportation |
| DOR | Designer of Record |
| DWB | Denver Water Board |
| EEO | Equal Employment Officer or Equal Employment Opportunity |
| EIA | Electronics Industry Association |
| EIS | Environmental Impact Statement |
| EPA | Environmental Protection Agency |
| FAA | Federal Aviation Administration |

| Abbreviation | Definition |
|---|---|
| FCC | Federal Communications Commission |
| FHWA | Federal Highway Administration |
| FM | Factory Mutual Association |
| FS | Federal Specifications (U.S. General Services Administration) |
| GCC | General Contract Conditions |
| GIS | Geographic Information Systems |
| GMP - | Guaranteed Maximum Price |
| IAPMO | International Association of Plumbing and Mechanical Officials |
| IBC | International Building Code (published by ICC) |
| IBR | Institute of Boiler and Radiator Manufacturer's |
| ICBO | International Conference of Building Officials |
| ICC | International Code Council |
| ICEA | Insulated Cable Engineers Association |
| IEEE | Institute of Electrical and Electronic Engineers |
| IES | Illuminating Engineering Society |
| IMC | International Mechanical Code (published by ICBO) |
| IPC | International Plumbing Code (published by ICBO) |
| ISA | Instrument Society of America |
| ITA | Independent Testing Agency |
| MIL | Military Specifications (Naval Publications and Forms Center) |
| MSS | Manufacturers Standardization Society of the Valve and Fittings Industry |
| MUTCD | Manual of Uniform Traffic Control Devices |
| NAAB | National Association of Air Balance |
| NACE | National Association of Corrosion Engineers |
| NBS | National Bureau of Standards (now called National Institute of Standards and Technology) |
| NEC | National Electric Code (NFPA 70) |
| NECA | National Electric Contractors Association |
| NEMA | National Electrical Manufacturer's Association |
| NESC | National Electrical Safety Code |
| NFC | National Fire Code (as published by NFPA) |
| NFPA | National Fire Protection Association |
| NICET | National Institute for the Certification of Engineering Technologies |
| NIST | National Institute of Standards and Technology |
| NGS | National Geological Survey |
| NLMA | National Lumber Manufacturers Association |
| NOAA | National Oceanic and Atmospheric Administration |

| Abbreviation | Definition |
|---|---|
| NRMCA | National Ready Mix Concrete Association |
| NTP | Notice to Proceed |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| OSHA | Occupational Safety and Health Administration |
| PCA | Portland Cement Association |
| PCI | Prestressed Concrete Institute |
| PDM | Precedent Diagram Method |
| PS | Product Standard of NIST (U.S. Department of Commerce) |
| PM | Project Manager |
| PMT | Project Management Team |
| PXP | Project Execution Plan |
| QA | Quality Assurance |
| QC | Quality Control |
| RFI | Request for Information |
| RTD | Regional Transportation District |
| SC | Special Contract Condition |
| SDI | Steel Door Institute |
| SMACNA | Sheet Metal and Air Conditioning Contractor's National Association |
| SSPWC | Standard Specifications for Public Works Construction |
| TCP | Traffic Control Plan |
| TSA | Transportation Security Administration |
| UL | Underwriters Laboratories, Inc. |
| USC | United States Code |
| WBS | Work Breakdown Schedule |

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **014220**

# SECTION 014225 - REFERENCE STANDARDS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contract Documents.

### 1.2 SUMMARY

A. This Section contains a summary of industry-accepted and recognized standards published by trade associations, government, and institutional organizations that are referred to in the various Sections of these specifications or elsewhere in the Contract Documents.

B. Standards listed herein are included in the Contract Documents by this reference and become a part of the Contract Documents to the same extent as though included in their entirety unless specific limitations are noted in the individual specifications Sections.

C. Listings of reference standards include name and address of the organization publishing the standard, and the full name and designator of each of the standards referenced herein.

D. If a publication date or edition number is listed with the reference standard, that publication date or edition number shall apply. Otherwise, the publication date or edition number in effect at the Effective Date of the Development Agreement date shall apply.

E. Inclusion of reference standards herein does not make the DEN Project Manager an agent of the publishing agency, nor does it obligate the DEN Project Manager to perform inspections required by or to enforce rules or regulations contained in the reference standards.

F. The following standards (latest edition as of the Effective Date of the Development Agreement) may need to be adjusted by mutual agreement to accommodate the existing structure of the renovation project.

### 1.3 SCHEDULE OF REFERENCE STANDARDS

A. American Concrete Institute (ACI) 38800 Country Club Drive, Farmington Hills, MI 48331

1. ACI 211.1–Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
2. ACI 301–Specifications for Structural Concrete for Buildings.

3. ACI 304–Recommended Practices for Measuring, Mixing, Transporting and Placing Concrete.
4. ACI 304.2R–Placing Concrete by Pumping Methods.
5. ACI 305R–Hot Weather Concreting.
6. ACI 306R–Cold Weather Concreting.
7. ACI 318–Building Codes Requirements for Structural Concrete

    a. Reference to ACI 318 may be limited to more stringent requirements of local building code.

B. American Society for Testing and Materials (ASTM), International 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428:

1. ASTM A 27–Mild to Medium Strength Carbon - Steel Casting for General Application.
2. ASTM A 36–Structural Steel.
3. ASTM A 47–Malleable Iron Castings.
4. ASTM A 82—Specification for Steel Wire, Plain, for Concrete Reinforcement: Replaced by A1064
5. ASTM A 123–Hot-dip Galvanizing.
6. ASTMA 184–Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
7. ASTM A 185—Specifications for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement: Replaced by A1064
8. ASTM A 283–Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars.
9. ASTM A 615–Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
10. ASTM A 706–Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
11. ASTM C 25–Method for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime.
12. ASTM C29–Unit Weight and Voids in Aggregate
13. ASTM C 31–Methods of Making and Curing Concrete Test Specimens in the Field.
14. ASTM C 33–Specification for Concrete Aggregates.
15. ASTM C 39–Test Method for Compressive Strength of Cylindrical Concrete Specimens.
16. ASTM C 42–Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
17. ASTM C 76–Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
18. ASTM C 88–Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
19. ASTM C 94–Specification for Ready Mixed Concrete.
20. ASTM C 109–Compressive Strength of Hydraulic Cement Mortars
21. ASTM C 110–Methods for Physical Testing of Quicklime, Hydrated Lime, and Limestone.
22. ASTM C 117–Materials Finer than 75 mm (No. 200) Sieve in Mineral Aggregates by Washing.
23. ASTM C 131–Resistance of Abrasions of Small Size Coarse Aggregate by Use

of the Los Angeles Machine.

24. ASTM C 136–Method for Sieve Analysis of Fine and Coarse Aggregates.
25. ASTM C 138–Unit Weight, Yield, and Air Content of Concrete.
26. ASTM C 143–Test Method for Slump of Hydraulic – Cement Concrete
27. ASTM C 150–Specification for Portland Cement
28. ASTM C 171–Specification for Sheet Material for Curing Concrete.
29. ASTM C 172–Method of Sampling Fresh Concrete.
30. ASTM C 173–Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
31. ASTM C 231–Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
32. ASTM C 260–Specification for Air Entraining Admixture for Concrete.
33. ASTM C 309–Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
34. ASTM C 443–Joints for Concrete Pipe and Manholes, using Rubber Gasket
35. ASTM C 494–Specification for Chemical Admixtures for Concrete.
36. ASTM C 595–Blend Hydraulic Cements.
37. ASTM C 618–Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete
38. ASTM C 655–Reinforced Concrete D Load Culvert, Storm Drain, and Sewer Pipe.
39. ASTM C 789—Precast Reinforced Concrete Box Sections for Culverts, Storm Drains and Sewers: Replaced by C1433
40. ASTM C 803–Test Method for Penetration Resistance of Hardened Concrete.
41. ASTM C 805–Test Method for Rebound Number of Hardened Concrete.
42. ASTM C 977–Specification for Quicklime and Hydrated Lime for Soil Stabilization.
43. ASTM D 75–Sampling Aggregate.
44. ASTM D 422–Test Method for Particle Size Analysis of Soils.
45. ASTM D 516-88–Standard Test Method for Sulfate Ions in Water.
46. ASTM D 693—Crushed Stone, Crushed Slag and Crushed Gravel for Dryer Water-Bound Macadam Base Courses and Bituminous Macadam Base and Surface Courses of Pavements: Withdrawn
47. ASTM D 698–Laboratory Compaction Characteristics of Soil using Standard Effort
48. ASTM D 751–Test Method for Coated Fabrics
49. ASTM D 1556–Test Method for Density of Soil in Place by the Sand-Cone Method.
50. ASTM D 1557–Laboratory Compaction Characteristics of Soil using Modified Effort
51. ASTM D 1682—Ultraviolet Resistance Grab Tensile Strength Grab Tensile Elongation Toughness: Replaced by D5034 and D5035
52. ASTM D 1751–Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
53. ASTM D 1752–Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
54. ASTM D 2167–Test Method for Density of Soil in Place by the Rubber-Balloon Method.
55. ASTM D 2216–Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures.

56. ASTM D -79 (2011) Hydroxypropyl Methylcellulose
57. ASTM D 2419–Sand Equivalent Value of Soils and Fine Aggregate.
58. ASTM D 2487–Test Method for Classification of Soils for Engineering Purposes.
59. ASTM D 2922—Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Method: Replaced by D6938
60. ASTM D 3017—Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth): Replaced by D6938
61. ASTM D 3665–Random Sampling of Paving Materials.
62. ASTM D 4253–Test Method for Maximum Index Density of Soils Using Vibratory Table.
63. ASTM D 4318–Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
64. ASTM D 4397–Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications.
65. ASTM D 4546–Test Method for One-Dimensional Swell or Settlement Potential of Cohesive Soils.
66. ASTM E 329–Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
67. ASTM F 477–Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
68. ASTM F 758–Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport and Similar Drainage.

C. American Welding Society (AWS), 550 NW LeJeune Road, Miami, FL 33135 AWS Code for Welding in Building Construction (Structural Welding Code).

D. Concrete Reinforcing Steel Institute (CRSI) 933 N. Plum Grove Road, Schaumburg, IL 60195, (312) 490-1700:

1. Manual of Standard Practice.

E. Federal Highway Administration (FHWA) Superintendent of Documents, US Government Printing Office, Washington DC, 20402:

1. Manual of Uniform Traffic Control Devices (latest edition).

## PART 2 - PRODUCTS (Not used)

## PART 3 - EXECUTION (Not used)

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **014225**

## SECTION 014310 -DEN QUALITY ASSURANCE

See Technical Requirements, I.10.8 Quality Management Plan (QMP)

### PART 1 - GENERAL (Not Applicable)

### PART 2 - PRODUCTS (Not Applicable)

### PART 3 - EXECUTION (Not Applicable)

END OF SECTION **014310**

# SECTION 014510 - CONTRACTOR QUALITY CONTROL

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. See Technical Requirements I.10.8 and 2015 International Building Code, Chapter 17.

END OF SECTION **014510**

# SECTION 014525 - MATERIAL TESTING AGENCY

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. The Contractor shall employ the services of a Material Testing Agency; hereafter referred to as the Contractor Testing Agency (CTA). This Section identifies the requirements for the Contractor to employ a Material Testing Agency and identifies the required activities of the Material Testing Agency.

B. Laboratory and field-testing requirements to be conducted by the CTA for materials and construction methods used on this project are included in the appropriate technical specifications.

C. Inspections and tests conducted by the CTA shall not in any way relieve the Contractor of the Contractor's responsibility and obligation to meet all specifications and referenced standards. Employment of the CTA does not relieve the Contractor of providing the required Quality Control program.

D. When inspections or tests by the CTA prove that the item or material does not meet all applicable specifications and requirements, the cost incurred for the re-testing or re-inspection shall be borne by the Contractor as per this Section.

E. 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.

F. The Contractor is obligated to correct any item deemed deficient at no additional cost to DEN.

### 1.3 SUBMITTALS

A. All testing will be available and uploaded to Aconex.

### 1.4 CONTRACTOR SUBMITTAL OF PROPOSED TESTING AGENCIES

A. The Contractor shall employ the services of a CTA that has been accredited by AASHTO or CCRL or an approved equal to perform the tests required in the Contract.

The CTA may also provide technicians to perform the required inspections. However, inspection and testing cannot be performed simultaneously by the same technician. The Contractor shall receive written acceptance from the DEN Project Manager of the CTA prior to any permanent work being installed or tested.

B. The Contractor shall not submit for acceptance to the DEN Project Manager any testing agency or laboratory utilized in the design or construction document preparation or presently employed by DEN as part of DEN Quality Assurance, Material Testing, or special inspection agencies.

C. For consideration of acceptance, the Contractor shall submit to the DEN Project Manager the following items received from the CTA:

1. Affidavit of current accreditation from a national certification and/or accreditation programs.
2. Evidence that the CTA Laboratory is accredited to perform the testing required in the Contract Documents.
3. Resumes and evidence of professional engineer registration and licensing in the State of Colorado for the personnel reviewing and signing test reports.
4. Resumes and current certifications verifying that CTA management and supervisory personnel, laboratory staff, field testing technicians, and inspecting technicians are qualified in accordance with ASTM C 1077, D 3666, D 3740, and E 329 requirements to perform the Work. NICET, ACI, WAQTC, LabCAT, CDOT, NRMCA, PCA, AWS, ASNT certifications or a degree in a related engineering field with construction field experience that can demonstrate qualifications. A list summarizing all management, supervisory, laboratory, field testing, and inspection personnel assigned to the Project including the testing and/or inspection each individual will be performing, certifications held by each individual, and the expiration date of each certification.
5. A matrix indicating each technical specification section, paragraph, quantity and type of sampling and/or testing required.
6. Copies of all laboratory, field testing, and inspection report forms.

## 1.5 SUBMITTAL OF REPORTS

A. Test results shall be submitted by the Developer to the DEN via Aconex after completion of inspections/tests by the CTA and prior to incorporation of the items into the Work unless the test or inspection must be done during or after installation.

B. The draft test results shall also be attached to the Daily Quality Control Inspection Report and transmitted to the DEN Project Manager the next workday. Any failure will be set forth distinctly on the Daily Quality Control Inspections Report and through a NCR.

C. Test reports will be submitted daily electronically via Aconex and reviewed weekly. The test format will be set forth in the quality control program of the project. All test results must be reviewed and signed by a registered licensed engineer in the State of Colorado. The signature represents that the test procedures used are in strict conformance with the applicable testing standard, the calculated data are true and

accurate, the tools and equipment used were in calibration, the sample was not contaminated and the persons running the test were qualified.

D. Reports of inspections and test activities are record documents and shall be maintained in a manner that provides integrity of item identification, acceptability, and traceability. Reports shall identify the following:

1. Contractor's name.
2. DEN Contract number and title.
3. Material Testing Agency name.
4. Name of items inspected/tested including a physical description and, as applicable, model and make.
5. Quantity of items.
6. Inspection/test procedure used. If national standards are used, any deviation from these standards.
7. Date the sample was taken and the date the test was made.

E. Location (by coordinates, building grid or station number and elevation) of where tests and/or samplings were performed including environmental condition where applicable. Include plan drawing indicating location of test, lot size and location and work item sampled or tested.

1. Name of inspector/tester.
2. In the event the testing or sampling is a re-test or re-sampling, reference the previous respective testing or sampling report.
3. Specified requirements in the Contract that the item must meet. Include reference to technical specification section and paragraphs.
4. Acceptability.
5. Deviations/nonconformance.
6. Evaluation of results.
7. All information required for the specific test as specified in the applicable ASTM standard.
8. Signature of authorized evaluator.

1.6 WEEKLY SUMMARY REPORTS

A. The CTA and Developer’s Quality Control Manager will include in its weekly summary report as part of our weekly meeting with DEN results from quality control tests and inspections.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

3.1 REMOVAL OF NONCONFORMING MATERIAL

A. The Developer is obligated to correct or remove nonconforming materials, whether in

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

3.2 PERFORMANCE

A. If the DEN Project Manager determines that the CTA or its personnel are not effectively enforcing or performing the testing and documentation requirements specified in the Contract, DEN will notify the Contractor of the issue, in writing, the Contractor will have 14 days to resolve the issue. If the parties cannot agree with the proposed solution then the Contractor will remove and replace CTA or such personnel at no cost to DEN.

3.3 CONTROL OF MEASURING AND TEST EQUIPMENT

A. The CTA shall select measuring and test equipment in such a manner as to provide proper type, range, accuracy, calibration, and tolerance for determining compliance with specified requirements. Measuring and test devices shall be calibrated, adjusted and maintained at prescribed intervals prior to use based upon equipment stability and other conditions affecting measurement. Provisions shall be made for the proper handling and storage of equipment. Calibration shall be accomplished using certified standards that have a known traceable relationship to the National Institute of Standards and Technology. Every calibrated measuring and test device shall show the current status, date of last calibration and the due date for the next calibration. Calibration records shall be maintained onsite as quality records and shall be made available for inspection upon the DEN Project Manager's request.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under the Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

B. Refer to Title 17 - Inspection and Defects of the General Contract Conditions, 2011 Edition, for guidance on payment methods.

END OF SECTION **014525**

# SECTION 014545 - SPECIAL INSPECTION AGENCY AND OWNER TESTING AGENCIES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents, and 2015 International Building Code Chapter 17, apply to this Section.

B. Special Inspection Statement issued as part of the application for building permit for the specific task or project.

### 1.2 SUMMARY

A. The Owner will employ the services of Special Inspection Agencies (SIA) or Owner Testing Agency (ITA). This Section identifies the requirements for the Contractor to coordinate, facilitate, and support DEN and its agents and consultants to fulfill the requirements of Special Inspection.

1. Any additional tests deemed necessary by the Building Official, Engineer of Record, Special Inspector or DEN Project Manager to assure these agencies SIA/OTA that all material and work on the Project meet the requirements of the Contract and all applicable codes and regulations.
2. Minimum Laboratory and field testing requirements to be conducted by the SIA/OTA for materials and construction on this Project are included in the Special Inspection Statement
3. All caissons and piers drilling on this Project shall be continuously inspected by Special Inspection Agency SIA/OTA hired by DEN directly.
4. The Contractor shall not perform any work that could cover work or material that has not passed the requirement of special inspection or require the presence of the special inspector to meet the requirements of continuous or periodic inspection.
5. It is the responsibility of the Contractor to plan, coordinate all testing requirements on the project to assure no delays are occurring due to the lack of inspection or testing.
6. The Contractor must allow sufficient time in the schedule to perform all required inspection and testing.
7. All rework due to nonconformance, failing tests or rework to test covered work prior to proper inspection and testing shall be borne by the Contractor.
8. All re-inspections and re-testing costs due to non-conformances or failing tests or revisiting to test covered or incomplete work shall be borne by the Contractor.
9. Periodic welding inspection shall include the minimum of fitting inspection and final inspection at all times.
10. Inspections and tests conducted by the SIA/OTA shall not relieve in any way the Contractor of the Contractor's responsibility and obligation to meet all specifications and referenced standards. Employment of the SIA/OTA does not

relieve the Contractor of providing the required Quality Control program.

11. When inspections or tests by the SIA/OTA prove that the item or material does not meet all applicable specifications and requirements, the cost incurred for the re-testing or re-inspection shall be borne by the Contractor. 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.
12. The Contractor is obligated to correct any item deemed deficient at no additional cost to DEN.

## 1.3 SUBMITTALS

A. All submittals shall comply with requirements of Section 013300 "Submittals" and Section 013325 " "Shop and Working Drawings, Product Data and Samples" for submittal requirements.

## 1.4 CONTRACTOR SUBMITTAL OF PROPOSED CONTRACTOR'S TESTING AGENCIES

A. In Projects requiring Special Inspection where the Contractor is utilizing certified shop to produce material DEN requires that testing be performed to satisfy the certification be no less than the following: All material and workmanship meets the requirements of a Contractor Material Testing Agency (CTA).

B. The Contractor shall employ the services of a Testing Agency (CTA) for process control and acceptance by the subcontractors and suppliers or material delivery for Contractor convenience or contractual obligations with others.

C. The Contractor's Testing Agency (CTA) must be accredited agency to perform any test required to be submitted for compliance with a Contract requirement or for use of data by DEN agencies for any official use, for examples and not to grant any obligation on the DEN Project Management Team, any payment reduction factor calculation. Any dispute or requirement to recalibrate testing equipment or machine, proof of compliance of material that was installed in contrary to manufacturer recommendation, any apparent defect due to adverse weather, improper installation, incomplete material record.

D. Contractor's testing agency (CTA) must be a qualified entity that has performed testing on similar jobs in size and complexity and has been accredited by AASHTO or CCRL or an approved equal to perform the tests required in the Contract. The CTA may also provide technicians to perform the required inspections. However, inspection and testing cannot be performed simultaneously by the same technician.

E. The Contractor shall not submit for acceptance to the DEN Project Manager any testing agency or laboratory utilized in the design or construction document preparation or presently employed by DEN as part of DEN Quality Assurance.

F. For consideration of acceptance, the Contractor shall submit to the DEN Project Manager the following items received from the CTA:

1. Affidavit of current accreditation from a national certification and/or accreditation program.
2. Evidence that the CTA Laboratory is accredited to perform the testing required in the Contract Documents.
3. Resumes and evidence of professional engineer registration and licensing in the State of Colorado for the personnel reviewing and signing test reports.
4. Resumes and current certifications verifying that SIA management and supervisory personnel, laboratory staff, field testing technicians, and inspecting technicians are qualified in accordance with ASTM C 1077, D 3666, D 3740, and E 329 requirements to perform the Work. NICET, ACI, WAQTC, LabCAT, CDOT, NRMCA, PCA, AWS, ASNT certifications, or a degree in a related engineering field with construction field experience can demonstrate qualifications. A list summarizing all management, supervisory, laboratory, field testing, and inspection personnel assigned to the Project including the testing and/or inspection each individual will be performing, certifications held by each individual, and the expiration date of each certification.
5. A matrix indicating each technical specification section, paragraph, quantity and type of sampling and/or testing required.
6. Copies of all laboratory, field testing, and inspection report forms.

## 1.5 SUBMITTAL OF REPORTS

A. Test results shall be submitted by the Special Inspector and/or Owner Testing Agency SIA/OTA to the DEN Project Manager after completion of inspections/tests by the SIA/OTA and prior to incorporation of the items into the Work unless the test or inspection must be done during or after installation.

B. All field test results including but not limited to fresh concrete properties and in-place moisture-density shall be reported in legible draft form to the DEN/PMT Inspection and the Contractor Quality Control Manager immediately at the test site. Any failing test shall be reported separately to the DEN/PMT Inspector or DEN Project Manager as soon as possible after the discovery.

C. The Contractor’s Quality Control Manager or his/her Authorized representative must keep track and official record of all tests passed, failed, or defected. The Contractor shall be fully responsible to show passing tests of all required elements. The lack of any passing test record of any required element does not waive the requirement to of testing or inspection as required by the Contract Documents and the IBC. The Contractor shall bear all costs associated with recovering missing tests including but not limited to the cost of the cost of disassembling, testing or inspecting, reassembling, and any indirect time or cost impacts of a missing required test or inspection.

D. Typed test reports shall be provided by the testing agency SIA/OTA to the DEN Project Manager as specified in Part 1 of this Section Weekly Summary Reports. The test reports shall be numbered sequentially in chronological order. Individual tests shall be

numbered sequentially. The reports and tests shall also be organized per specification section. All test results must be reviewed and signed by a registered licensed engineer in the State of Colorado. The signature represents that the test procedures used are in strict conformance with the applicable testing standard, the calculated data are true and accurate, the tools and equipment used were in calibration, the sample was not contaminated and the persons running the test were qualified.

E. A plan of work and administrative procedure shall be established to assure that all test and inspections frequency required are performed and all defects are tracked and retested and re-inspected to meet all applicable specifications, codes, and standards.

F. The Contractor shall track all tests performed on the daily reports and shall submit a statement for each phase of the Work showing all elements of Quality have been completed and all defects are addressed or scheduled to be addressed prior to covering the Work.

G. Reports of inspections and test activities are record documents and shall be maintained in a manner that provides integrity of item identification, acceptability, and traceability. Reports shall identify the following:

1. Contractor's name.
2. DEN Contract number and title.
3. Testing Agency name.
4. Name of items inspected/tested including a physical description and, as applicable, model and make.
5. Quantity of items.
6. Inspection/test procedure used. If national standards are used, any deviation from these standards.
7. Date the sample was taken and the date the test was made.
8. Location, by coordinates, building grid or station number, of where tests and/or samplings were performed including environmental condition where applicable. Include plan drawing indicating location of test and work item sampled or tested.
9. Name of inspector/tester.
10. In the event the testing or sampling is a re-test or re-sampling, reference the previous respective testing or sampling report.
11. Specified requirements in the Contract that the item must meet. Include reference to technical specification section and paragraphs.
12. Acceptability.
13. Deviations/nonconformance.
14. Corrective action.
15. Evaluation of results.
16. All information required for the specific test as specified in the applicable ASTM standard.
17. Signature of authorized evaluator.

## 1.6 WEEKLY SUMMARY REPORTS

A. The SIA/OTA shall prepare and submit to the DEN Project Manager a weekly

summary report each week that summarizes by specification section all work activities and results for the quality control tests and inspections conducted during that period.

B. The weekly summary report shall be submitted within two (2) weeks from the end of the reporting period. At a minimum, the weekly summary report shall identify all inspections, test types, test locations, testers, test results, specifications, whether the test passed or failed, quantity of materials placed and the number of tests performed for each material, and the material supplier, installer and Contractor.

C. Re-tests shall be identified in a fashion that easily correlates to the failing test. Any failed tests that have not been corrected when the report is published shall be highlighted and noted in the cover letter of the report. The SIA shall identify costs of re-testing or additional site visits required due to scheduling changes. A current Corrective Action Report log (CAR) shall also be included in the weekly summary report.

D. The weekly report shall be submitted per Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" requirements.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 CORRECTION OR REMOVAL OF NONCONFORMING MATERIAL

A. The Contractor is obligated to correct or remove nonconforming materials, whether in place or not. If necessary, the DEN 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 DEN 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.

### 3.2 PERFORMANCE

A. If the DEN Project Manager determines that the SIA or its personnel are not effectively enforcing or performing the testing and documentation requirements specified in the Contract, the DEN Project Manager will, state in writing, the requirement for the Contractor to remove and replace SIA or such personnel at no cost to DEN.

### 3.3 CONTROL OF MEASURING AND TEST EQUIPMENT

A. The SIA shall select measuring and test equipment in such a manner as to provide proper type, range, accuracy, calibration, and tolerance for determining compliance with specified requirements. Measuring and test devices shall be calibrated, adjusted

and maintained at prescribed intervals prior to use based upon equipment stability and other conditions affecting measurement.

B. Provisions shall be made for the proper handling and storage of equipment. Calibration shall be accomplished using certified standards that have a known traceable relationship to the National Institute of Standards and Technology. Every calibrated measuring and test device shall show the current status, date of last calibration and the due date for the next calibration. Calibration records shall be maintained onsite as quality records and shall be made available for inspection upon the DEN Project Manager's request.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for Work under the Section. DEN Project Management Team staff will track all costs and remark the conditions and track all associated impacts for credits to the City. The contractor record of the same is only valid if signed by the DEN Project Manager or authorized representative.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for Work under this Section.

B. Refer to Title 17 - Inspection and Defects in the General Contract Conditions, 2011 Edition, for guidance on payment methods.

**END OF SECTION 014545**

# SECTION 015050 - MOBILIZATION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. The Work specified in this Section consists of preparatory work and operations including, but not limited to the following:

1. Those necessary for the movement of personnel, equipment, supplies, and incidentals to the work site.
2. For the establishment of all offices, buildings and other facilities necessary for the Work on the Project.
3. For all other work and operations that must be performed or costs incurred prior to beginning work on the various Contract items on the work site.

### 1.3 SUBMITTALS

### 1.4 DELIVERY

A. Delivery to the work site of construction tools, equipment, materials, and supplies shall be accomplished in conformance with all local governing regulations.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS

A. Provide construction tools, equipment, materials, and supplies of the type and quantities that will facilitate the timely execution of the Work.

## PART 3 - EXECUTION

### 3.1 EXECUTION AND REMOVAL

A. Provide personnel, products, construction materials, equipment, tools, and supplies at the work site at the time they are required and scheduled to be installed or utilized.

## PART 4 - MEASUREMENT

## PART 5 - PAYMENT

END OF SECTION **015050**

# SECTION 015210 - TEMPORARY FACILITIES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents. .

### 1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Section 312319 "Dewatering" for disposal of ground water at Project site.

### 1.3 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 Offices, Construction Yards and Storage Areas:

1. The Contractor's offices, construction yards laydown and storage areas shall be set forth in the Contract Documents and coordinated throughout the Construction phases. All construction offices, staging areas, and material storage areas will be set forth Contract Documents. .
2. Any activity that is expected to result in disturbance of the ground surface equal to or greater than one acre or part of a larger project that is expected to disturb equal to or greater than one acre, is required to be identified in their Erosion Control permit. These areas include, but are not limited to, laydowns, borrow areas, stockpiles, and storage areas regardless of the location.
3. All areas of ground disturbance are required to be stabilized in accordance with State, local, and airport rules and regulations prior to permit termination and/or closure of the Contract.
4. The Contractor shall restore any area on DEN property that becomes contaminated as a result of its operations in accordance with Airport Rule and Regulation 180. Restoration shall be either to applicable standards under Federal and State law or to such other levels as may be required by the Manager of Aviation, at the Manager’s sole discretion.
5. All temporary facility sites must be inspected prior to Contract closeout.

a. The DEN Project Manager or authorized representative shall conduct an inspection of contractor areas used during the life of the project. These areas include but are not limited to, staging areas, laydown areas, borrow areas, and contractor yards and offices.

6. The DEN Project Manager will ensure these areas have been properly stabilized in accordance with DEN Rules and Regulations and required permits. Site must be restored to the condition in which the City initially provided to the Contractor. A representative from DEN Environmental Services shall be present during the final walk through.
7. Contractor materials shall be managed in accordance with all applicable Environmental Regulations.
8. Temporary facilities which the Contractor desires to locate in secondary laydown and staging areas adjacent to the Work or within the project limits are subject to approval by the DEN Project Manager. If approved, these areas must also be included as part of their erosion control permit.
9. Access to and security of the Contractor's construction offices, yard, temporary facilities, and storage areas shall be as shown on the Contract Documents.

10. All Contractor Storage Yards must be fenced. Submit fencing plan and typical details to DEN Project Manager at least seven (7) days before planned execution for review and acceptance.
11. In accordance with Denver Fire Department Requirements, all Temporary Facilities shall have signage that lists the following information:

    a. Company Name
    b. Contact Telephone Number
    c. Facility Address

C. Electrical Service

1. Provide lighting and power for field offices, storage facilities and other construction facilities and areas.
2. Provide power centers for electrically operated and controlled construction facilities including tools, equipment, testing equipment, interior construction lighting, heating, cooling and ventilation equipment.
3. Provide night security lighting at secured areas within construction limits at offices, storage facilities, temporary facilities and excavated areas.
4. Provide battery operated or equivalent emergency lighting facilities at construction areas where normal light failures would cause employees to be subjected to hazardous conditions. Test such facilities monthly and maintain a record of these tests for the DEN Project Manager's review.
5. Contractor shall bear all costs of temporary electric 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/Communications Service:

1. The Contractor shall furnish, install, and maintain at least two (2) telephones in

the Contractor's main field office. These phones shall be manned at all times by the Contractor's personnel or by an answering machine when personnel are not in the field office. These telephones may be mobile phones.

2. Comply with requirements of Division 26 Sections.

E. Water Service:

1. 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 DEN 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 DEN Project Manager.
2. The Contractor shall not use in place fire hydrants or standpipes as sources for construction water or potable water.
3. Comply with requirements of Division 22 Sections.

F. 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.
2. Comply with requirements of Division 21 Sections.

G. Sanitary Service:

1. Furnish, install, and maintain temporary sanitary facilities and services throughout the construction period.
2. Ensure that separate or single user toilets shall be provided to ensure privacy between the sexes.
3. Provide general washing facilities adequate for the number of employees.
4. Provide special washing facilities adequate for the number of employees engaged in the application of paints, coating, and other volatile or hazardous materials.

## 1.4 SUBMITTALS

A. Temporary facilities will be set forth in the Contract Documents.

## 1.5 QUALITY CONTROL

A. Provide products for, and the execution of, the Work of this Section that will satisfy the requirements of all applicable codes. Provide products that satisfy the requirements of the applicable codes.

## PART 2 - PRODUCTS

### 2.1 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 and Division 26 requirements.

### 2.2 TELEPHONE/COMMUNICATIONS SERVICE

A. Provide equipment that is compatible with that of the current DEN service provider and the telephone exchange to which the Contractor connects.

### 2.3 POTABLE 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.

B. 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.

### 2.4 FIRE PROTECTION

A. Fire extinguishers shall be UL rated and shall comply with the International Fire Code with City of Denver amendments.

### 2.5 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, and shall be maintained in clean conditions.

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.

## PART 3 - EXECUTION

### 3.1 ELECTRICAL SERVICE

A. The approximate location of primary power lines is shown on DEN's Ancillary Site Plan. 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.

B. Comply with requirements of Division 26 Sections.

### 3.2 TELEPHONE/COMMUNICATION 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.

### 3.3 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. Comply with requirements of Division 22 Sections.

C. 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.

D. Provide sanitary bubbler drinking fountains if potable water service is available. Disinfect water piping before using for the potable water service.

E. Install vacuum breakers, backflow preventers, and similar devices in a manner and location that will prevent temporary water from returning to the water mains.

F. Do not incorporate any part of temporary water distribution system into the permanent water distribution system.

### 3.4 FIRE PROTECTION

A. Install products in conformance with the requirements of the applicable Denver Fire Department and OSHA regulations.

1. Provide functional, approved 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.

B. Instruct construction personnel as to location and use of temporary fire protection equipment.

C. Comply with requirements of Division 21 Sections.

3.5 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 workstations. 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 that 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.

3.6 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 five (5) feet of known utilities.

3.7 SIGNAGE

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

3.8 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 work site of other contractors.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this section.

END OF SECTION 015210

# SECTION 015215 - FIELD OFFICES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

1.2 SUMMARY

A. All office locations will be specified in the Contract Documents.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION (NOT USED)

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **015215**

# SECTION 015525 - TRAFFIC CONTROL

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. The Work specified in this Section consists of furnishing plans and designs for traffic control and haul routes, implementing these plans with all necessary personnel and equipment. Installation may require but not be limited to signage, cones, flaggers, signal lights, lighting and temporary roads.

B. All Work must be in conformance with the "Manual of Uniform Traffic Control Devices for Streets and Highways" (MUTCD) and CDOT Standard Plans regarding traffic control.

C. The Contractor must coordinate the Contractor's proposed traffic control needs with the needs of other contractors on the airport construction site in writing through the DEN Project Manager.

D. Refer to I.10.18 of the Technical Requirements “Traffic Management Plan” and also DEN’s Rules and Regulations.

### 1.3 QUALITY CONTROL

A. Temporary signal work shall conform to CDOT Standard Plans and the current version of the CDOT Standard Specifications.

B. Designate a qualified person to inspect and test traffic control devices daily and to ascertain that those devices are continuously operating, serviceable, in place, and clean.

C. Provide certified personnel who will be responsible for design, implementation, and inspection of traffic control needs.

### 1.4 SUBMITTALS

A. Submit a Traffic Control Plan (TCP) (also known as a Traffic Management Plan) that includes, at a minimum, the following list of items for approval before starting Work.

Submit an updated TCP when necessary to modify traffic operation or undertake a construction activity that creates a different traffic pattern:

1. Traffic blockade and reductions anticipated to be caused by construction operations.
2. Temporary detours.

B. Submit Haul Route Plan for both on- and off-site hauls. Haul Routes plan will be established in accordance with Division 015210 and the Contractors drawing and established during the design phase. The Haul Route Plan shall be submitted 14 days prior to hauling any permanent material. The Plan shall be updated as the Contractor's plans change.

C. Specific Traffic Considerations: The DEN Project Manager may require the Contractor to revise the Traffic Control Plan to address traffic considerations not included in the Contractor's plan.

D. Shutdown requests for any impact to traffic must be submitted for approval following the shutdown procedure. These requests will be made through the DEN Project Manager.

E. Emergency Considerations: for any emergency shutdown traffic requests the parties agree to work collaboratively in order to facilitate a 2 day shutdown request if possible.

## PART 2 - PRODUCTS

### 2.1 TRAFFIC CONTROL DEVICES

A. Devices including signs, delineators, striping, barriers, barricades, and high-level warning devices shall conform to the latest revision of the MUTCD and the latest revision of the Colorado Department of Transportation Standard Plans.

## PART 3 - EXECUTION

### 3.1 TEMPORARY TRAFFIC CONTROL DEVICES

A. Place temporary control devices in a manner that allows for the smooth flow of traffic at the posted speed limit, limiting hazards or abrupt changes in direction.

B. Place traffic cones or delineators as directed by the MUTCD. Operate warning lights between sunset and sunrise.

C. Place control devices so that approaching traffic is alerted to hazards and variances to normal traffic patterns.

D. Clean and repair damaged devices or replace them with new devices as required.

3.2 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS

A. Full-compliance striping is required at all times per the MUTCD.

B. Temporary signs must be replaced with permanent signing within three days per the MUTCD.

3.3 FLAGGERS

A. Furnish flaggers where required for safety and by the MHT.

3.4 CONSTRUCTION VEHICULAR TRAFFIC

A. Restrict construction vehicles to approved haul routes.

B. Haul routes on the airfield must be approved by Security.

3.5 CONTROLLING VEHICULAR AND PEDESTRIAN FLOW ADJACENT TO WORK SITE

A. Ensure that construction operations will not impede normal traffic. Where work is in the area of pedestrian or occupant activity, the Contractor shall detail a plan for managing pedestrian traffic safely.

3.6 SIGNS

A. Refer to the Contract Documents.

B. Coordinate and pay any expense associated with the furnishing and installation of all parking regulatory signs, such as "No Stopping Any Time," etc., at the work site.

C. Furnish and install any necessary advance detour or guidance signing.

D. Authorize, modify, and install regulatory parking controls and vehicle turn restrictions.

E. Implement those traffic control modifications outside of the traffic control zone that are necessary to manage diverted traffic.

**PART 4 - MEASUREMENT**

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 PAYMENT

A. Payment for Traffic Control under these schedules will be for work performed under the applicable unit price item or lump sum bid item.

END OF SECTION 015525

# SECTION 015719 - TEMPORARY ENVIRONMENTAL CONTROLS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Specifications Conditions and other Division 01 Specification Sections, apply to this Section.

B. Denver Municipal Airport System Rules and Regulations, Part 180-Environmental Management.

C. DEN Environmental Management System (EMS), Technical Requirements I.10.14 “Environmental Management Plan”, Technical Requirements Appendix 9 - ”DEN Environmental Guidelines”, and Development Agreement Article 5.14 “Environmental Compliance”.

D. Developer Project Management Plan: D&C Health and Safety and Plan.

E. Section 017420 “Cleaning”.

### 1.2 SUMMARY

A. The Work specified in this Section consists of identifying, and avoiding or mitigating adverse environmental impacts to air, water, soil, and other natural resources caused by construction activities.

1. The Contractor, in conducting any activity on airport property or in conducting work for an airport project not on airport property, shall comply with all applicable airport, local, state, and federal rules, regulations, statutes, laws, and orders.
2. Work shall not commence on any project until all FAA approvals have been received, applicable permits have been issued and signed by permitee, and all inspection requirements have been satisfied in accordance with State and local permitting requirements.

### 1.3 SUBMITTALS

A. Refer to Contract Documents.

B. Within ten (10) days after Notice to Proceed on a task order, the Contractor shall submit the following if applicable, unless waived by the DEN Project Manager:

1. Submittals pertaining to water quality management:

a. Construction Activities Stormwater Discharge Permit

1) City and County of Denver

   a) Sewer Use & Drainage Permit (SUDP)
   b) Construction Activities Stormwater Discharge Permit (CASDP)

2) Colorado Department of Public Health and Environment (CDPHE) Colorado Discharge Permit System (CDPS) Authorization to Discharge (Contractor need not submit a copy of the general permit or the general permit rationale)

   a) CDPS General Permit for Stormwater Discharges Associated with Construction Activities
   b) CDPS General Permit for Associated with Non-Extractive Industrial Activity
   c) CDPS General Permit for Construction Dewatering Discharges (Prior to obtaining a CDPS General Permit for Construction Dewatering Discharges permit, the Contractor shall submit a draft permit application and the final permit application for DEN review and approval PRIOR to submittal to CDPHE. The Contractor need not submit a copy of the general permit or the general permit rationale.

3) Upon request the contractor shall provide the following documentation

   a) Stormwater Management Plan (SWMP)
   b) CASDP Inactivation Request
   c) CDPS Notice of Termination
   d) Permit Transfer Application
   e) Modification Application
   f) Discharge Monitoring Reports (DMRs)
   g) A copy of the well permit from the state Division of Water Resources for every new well that diverts or for the monitoring of groundwater. (A draft copy of the Notice of Intent for any borehole structure filed with the state Division of Water Resources).
   h) Section 404 related permitting (Prior to obtaining a permit issued by the US Army Corps of Engineers, the contractor shall submit a draft copy of the application and coordinate with efforts DEN Environmental Services).

4) Revisions or amendments to the CASMP by the Contractor: At the completion of the Project, after final stabilization has been achieved and accepted in accordance with CASDP requirements, the Contractor shall submit a copy of the CASDP Inactivation Request.

2. Submittals pertaining to sewage holding tanks associated with buildings and trailers: For purposes of this Section, the generic term “sewage holding tank” means “individual sewage disposal system (ISDS)”, “privy vault”, “septic tank”, or “septic system”:

a. Draft copy of the permit application for a sewage holding tank.
b. Copy of the Sewer Use & Drainage Permit issued by the Denver Department of Public Works.
c. Copy of the ISDS permit issued by the Denver Department of Environmental Health.

3. Submittals pertaining to air quality management:

1) Copy of any permit issued by the CDPHE Air Pollution Control Division (APCD)

4. Submittals pertaining to storage tanks and containers:

a. Copy of the approved application issued by the State of Colorado, Department of Labor and Employment, Division of Oil and Public Safety, for installation of petroleum, or other regulated substances, storage tanks located on airport property and used for the Project.
b. Copy of permits issued by the Denver Fire Department for storage tank installations, storage tank removals, and hazardous materials use/storage.
c. Copy of Spill Prevention, Control, and Countermeasure (SPCC) Plan for petroleum storage tanks and containers with capacity of 55 gallons of oil or greater located on airport property and used for the Project.

5. Copies of any other plans, permits, permit applications, correspondence with regulatory agencies, including violations, waste manifests, results of laboratory analyses, or other environmental documentation required for the Project not previously identified herein.

## 1.4 RELATED DOCUMENTS

A. Code of Federal Regulations (CFR) Publications, including, but not limited to, the following:

1. 33 CFR 323 - Permits for discharges of dredged or fill materials into waters of the United States.
2. 40 CFR - Protection of Environment.
3. 49 CFR 171-180 Hazardous Materials Transportation Regulations.

B. Colorado Revised Statutes, including, but not limited to, the following:

1. Water Quality Control, Title 25, Article 8.
2. Air Quality Control, Title 25, Article 7.
3. Hazardous Waste, Title 25, Article 15.
4. Noise Abatement, Title 25, Article 12.
5. Petroleum Storage Tanks, Title 8, Article 20.5.
6. Liquefied Petroleum Gas (LPG) Storage Tanks, Title 8, Article 20, Part 4.
7. Solid waste regulations.

C. City and County of Denver Executive Orders, including, but not limited to, the

following:

1. Executive Order No. 115 - Required Use of Denver-Arapahoe Disposal Site (Landfill).
2. Executive Order No. 123 - Greenprint Denver Office and Sustainability Policy.
3. Denver Revised Municipal Code, Title II, Sections 48-44 and 48-93 - Solid Waste.

D. City and County of Denver Construction Sites Program.

E. City and County of Denver Construction Activities Stormwater Management Plans Information Guide.

F. Any other applicable rules, regulations, ordinances, and guidance must be followed as applicable.

G. Refer to Section 013300 "Submittal Procedures" and 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.

H. Refer to Section 017419 "Construction Waste Management" for waste management requirements

## PART 2 - PRODUCTS

2.1 PRODUCTS

A. Products required for the Work shall meet all Environmental Requirements.

B. At a minimum, products for erosion and sediment control must conform to the technical requirements contained in the City and County of Denver "Construction Activities Stormwater Manual" and the current version of the "Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, Volume 3: Best Management Practices".

## PART 3 - EXECUTION

3.1 AIR POLLUTION CONTROLS

A. The Contractor shall use appropriate control measures to comply with applicable air quality permit requirements. Additionally, the Contractor must be aware of the following procedures and techniques while conducting construction activities on DEN property. NOTE: Application of dust control measures should be discussed and outlined in the Dust Control Plan.

1. Apply water as needed to the construction site haul roads, disturbed surface areas and public access roads as needed to suppress dust. The use of chemical stabilizer can be requested by the Contractor. The type of stabilizer to be used

and locations of use must be included in the Dust Control Plan, which must be approved by the DEN Project Manager prior to application.

2. The Contractor shall suspend all earthmoving activities if wind speed exceeds 30 mph. For purposes of this Section, the generic term “earthmoving” means clearing, grubbing, excavation, topsoil removal, backfilling, embankment work, grading, trenching, drilling, and installation of borings. Contractors are expected to check wind speeds with the airport’s ramp tower to demonstrate compliance with this requirement. In addition, the Project may be shut down if two of three of the Runway Visual Range (RVR) instruments read visibility of 2,400 feet or less. The instruments are used by FAA Control Tower personnel to ensure safe aircraft operations. Costs for shutdowns due to wind velocities or RVR readings shall not be grounds for delay or extra cost claims.

B. Burning of materials is strictly prohibited on DEN property.

## 3.2 WATER POLLUTION CONTROLS

A. The Contractor shall conduct construction activities in accordance with all applicable permit requirements. In addition, the Contractor shall comply with the following procedures and requirements while conducting activities on DEN property:

1. Water encountered during construction cannot be discharged to the stormwater system or placed onto the ground surface without a permit AND prior written approval by the DEN Project Manager. If groundwater or stormwater is anticipated to be encountered and the Contractor desires to discharge it to the stormwater system or onto the ground surface, then the Contractor must obtain an appropriate CDPS discharge permit in advance of the discharge unless this activity is specifically authorized under the CDPS Construction Stormwater Permit.
2. If water is encountered and the Contractor desires to discharge these waters to the sanitary sewer system, then the Contractor must obtain approval from DEN Environmental Services in advance of the discharge.
3. The Contractor shall ensure that stormwater that comes in contact with storage areas does not become impacted and discharged to the stormwater sewer system or to an impervious surface. Furthermore, any materials in storage areas shall not be stored directly on the ground. Refer to Section 264200 "Cathodic Protection" for cathodic protection requirements.
4. The Contractor shall not operate any valves, sluice gates or other drainage appurtenances related to any DEN sewer system without the prior approval of both the DEN Project Manager and DEN Environmental Services. Any violation of this directive may result in the payment of a financial penalty by the Contractor if the State of Colorado assesses such a penalty.

## 3.3 EROSION CONTROL AND SEDIMENTATION CONTROL

A. This Work consists of constructing, installing, maintaining and removing, if required, temporary and permanent control measures during the life of the Contract (and possibly afterward) until the Contractor achieves final stabilization of the site to prevent

or minimize erosion, sedimentation, and pollution of any state waters in accordance with all Environmental Requirements.

B. The Contractor is responsible for compliance with all requirements in accordance with the CASDP, the City and County of Denver Construction Sites Program, the approved CASMP, and CDPS-issued permits.

C. Temporary facilities, including but not limited to storage areas, laydowns, borrow areas, and contractor offices and work yards, shall be managed in accordance with Section 015210 "Temporary Facilities".

D. Clean soil fill may be stockpiled in any area that has been previously approved and signed off by the DEN Section Manager of Construction, Design and Planning, and Environmental Services. Soil stockpiles are considered a potential pollutant source and must be addressed in the CASMP and/or SWMP.

E. Make immediately available, upon the DEN Project Managers request, all labor, material, and equipment judged appropriate by the DEN Project Manager to maintain suitable erosion and sediment control features. These actions requested by the DEN Project Manager take precedence over all other aspects of project construction that have need of the same labor, material and equipment, except those aspects required to prevent loss of life or severe property damage.

## 3.4 CONSTRUCTION OF CONTROL MEASURES FOR EROSION AND SEDIMENTATION

A. The Contractor must install control measures in accordance with the most recent version of the "Urban Drainage and Flood Control District’s Urban Storm Drainage Criteria Manual, Volume 3: Best Management Practices and the City and County of Denver Construction Activities Stormwater Manual".

1. Deviations from these two documents are allowed with written consent from the City and County of Denver NPDES Inspector.

## 3.5 STORAGE OF OIL, FUELS, OR HAZARDOUS SUBSTANCES

A. The Contractor shall prevent oil or other hazardous substances, as defined in federal and state regulations, from entering the ground, drainage or local bodies of water, and shall provide containment, diversionary structures, or equipment to prevent discharged oil from reaching a watercourse and take immediate action to contain and clean up any spill of oily substances, petroleum products, or hazardous substances. The Contractor shall provide one or more of the following preventive systems at each petroleum storage site:

1. Dikes, berms, or retaining walls capable of containing at least 100% of the volume of the largest single tank and equipped with sufficient freeboard to contain precipitation events. The secondary containment must be “sufficiently impermeable” to prevent a release to the environment.

2. Culverting, curbing, guttering, or other similar structures capable of containing at least 100% of the volume of the largest single tank and freeboarding from precipitation.

B. The provision of such preventive systems shall be subject to acceptance by the DEN Project Manager prior to tank installation and shall follow the SPCC regulations (40 CFR Part 112).

C. Prior to bringing any containers of 55-gallon or above capacity onto DEN property for storage of oil, fuel, or other petroleum substances, the Contractor may be required to prepare an SPCC Plan that conforms to 40 CFR Part 112. The plan must include a certification either from a Professional Engineer or self-certification, if applicable, as well as management approval from the legally responsible Contractor representative.

## 3.6 SPILL RESPONSE AND NOTIFICATION

A. The Contractor is responsible for all spills that may result from its activities. For ANY suspected or confirmed release or spill of oil, fuel, solid waste, hazardous waste, unknown materials, lavatory waste, or miscellaneous chemicals, etc., that occurs as the result of the Contractor's activities on DEN property, the Contractor is required to take immediate action to mitigate the release or spill and report it to the DEN Project Manager and to the DEN Communications Center at (303) 342-4200.

B. The Contractor is responsible for notifying the appropriate regulatory agency in the event suspected and/or confirmed releases are identified, in accordance with regulatory requirements.

## 3.7 SITE REMEDIATION AND RESTORATION

A. The Contractor shall be required to perform any necessary site assessment and remediation activities required by applicable regulatory agency.

B. During routine construction activities, the Contractor is required to manage soils using typical construction techniques. The Contractor must differentiate between soils and wastes, including contaminated soils versus clean soils, and determine those materials that can remain on DEN property and those that must be transported off site for disposal.

C. During all construction activities that require the management of soils, the Contractor must notify the DEN Project Manager and DEN Environmental Services (ES) that soils being managed may be impacted by industrial activities conducted at the airport. "Process knowledge" pertaining to previous use and/or impact for the locations under construction can be used to determine whether impacted soils are probable. Also, common indices such as soil staining and odor can be used as a determination for the probable condition. If probable contamination conditions are suspected, the Contractor will notify the DEN Project Manager and DEN ES immediately. At that time, which may be before the Work is initiated where indicative conditions exist, all work will cease until a sampling and analysis approach is determined and implemented by the proper

responder.

D. If the site conditions warrant based on evidence of spillage or contamination, process knowledge, and/or visual or olfactory observations, the Contractor may be required to conduct sampling and analysis to confirm that no remedial action is required. Prior to conducting any removal activities, the Contractor must provide a Scope of Work to the DEN Project Manager describing the proposed site assessment activities.

E. The impacted project will modify its operation to include a segregation area where probable impacted soils can be placed, stored, and sampled for characterization. Should the soil materials be determined to exceed the applicable standards, the DEN Project Manager, in conjunction with DEN ES, will be responsible for the proper disposal of these materials. Materials that are determined to contain contamination levels below the applicable standards can be considered clean soils and placed back into the excavation or reused elsewhere on DEN property. In accordance with Part 3 of this Section, materials removed that are suitable for recycling will be placed within areas designated on DEN to store these materials.

F. The Contractor shall restore any area on the Airport that becomes contaminated as a result of its operations. Restoration shall be either to applicable standards under federal and state law or to such other levels as may be required by the Manager of Aviation, at the Manager's sole discretion. Such restoration shall be completed at the earliest possible time, and the Contractor's restoration shall be subject to inspection and approval by the Manager of Aviation or duly authorized representative. See DEN Rules & Regulations - Part 180.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

B. Payment of all fees associated with review of environmental permit applications and processing of environmental permits are set forth in the Contract Documents.

END OF SECTION 015719

# SECTION 015810 - TEMPORARY SIGNS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes requirements for the following:

1. Construction signage visible to the public.
2. Temporary directional, informational, or regulatory signage.

B. Related Requirements:

1. Section 015210 "Temporary Facilities" for requirements for temporary facilities.

2. Section 015525 “Traffic Control.”

3. DSM General Standards and Criteria, Chapter 23 “Signage and Graphics Drawings:.

### 1.3 SUBMITTALS

A. Submit temporary sign finishes, materials and paint, etc., for review and approval by DEN Project Manager prior to any fabrication.

### 1.4 QUALITY CONTROL

A. Construction and other temporary signage visible to the public must be commercial grade quality, professionally fabricated, ADA compliant and installed based on the location of the sign. The Contractor is responsible to maintain this signage until it is no longer needed, and to remove signage from the site.

## PART 2 - PRODUCTS

### 2.1 GENERAL

A. Interior signs that are visible and not physically accessible to the public may be made of rigid board, such as “Gator Board”, with vinyl messages. All edges must be finished

and all fasteners concealed.

B. Interior signs that are visible and physically accessible by the public must be vandal-proof. Acceptable examples of vandal-proof signs are messages applied second surface with concealed tamperproof fasteners.

C. Exterior signs must be vandal-proof and fabricated of weatherproof materials.

## PART 3 - EXECUTION

### 3.1 HARDWARE

A. Interior Signs: Attach with suitable adhesive and/or tape which may be removed without damage to finishes.

B. Exterior Signs: Must be secured to withstand site conditions and varying weather conditions.

### 3.2 SIGN FINISHES, MATERIALS, AND PAINT

A. Provide temporary signage to reflect permanent sign design and/or as directed by the DEN Signage Design Project Manager. Submit temporary sign finishes, materials and paint, etc., for review and approval prior to any fabrication.

### 3.3 MAINTENANCE

A. The Contractor shall maintain temporary signage until it is no longer needed, as determined by DEN Project Manager.

### 3.4 REMOVAL

A. The Contractor shall remove all temporary signs, and clean and refurbish affected areas to their original, or intended, condition.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

# SECTION 016000 - PRODUCT REQUIREMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

Related Requirements:

1. Section 012510 "Substitutions" for requests for substitutions.
2. Technical Requirements I.8.3.
3. Section 017330 “Cutting and Patching”

### 1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through Design Development process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Comparable Product Requests will be addressed during the Design Development. Any comparable product requests which occur during construction will be handled as a Substitution Request in accordance with the Contract Documents.

### 1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project all products should be compatible.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Submittals should comply with the Contract Documents.

**PART 2 - PRODUCTS**

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged, and unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. All products shall comply with the Warranties established in the Contract Documents.
4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered as set forth in the Contract Documents.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered as set forth in the Contract Documents.
    b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered as set forth in the Contract Documents.
    b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

## 2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: DEN Project Manager will consider Contractor's request

for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, DEN Project Manager may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. Samples, if requested.

2.3 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials:. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

**PART 3 - EXECUTION (Not Used)**

**PART 4 - MEASUREMENT**

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

**PART 5 - PAYMENT**

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **016000**

# SECTION 016610 - STORAGE AND PROTECTION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

### 1.2 SUMMARY

A. The Work specified in this Section consists of providing storage and protection of the materials, products and supplies within the construction work zone which are to be incorporated into the construction as recommended by the manufacturer.

B. Related Requirements:

1. Section 015210 "Temporary Facilities" for requirements for temporary facilities.

### 1.3 SUBMITTALS

A. Coordinate the locations of storage areas not indicated on the Contract Drawings during the weekly progress meetings.

## PART 2 - PRODUCTS

### 2.1 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 DEN Project Manager, shall be uniform in appearance with similar materials used to the maximum extent possible.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS OF EXECUTION

A. Palletize materials, products, and supplies that are to be incorporated into the construction and stored off the ground. Material and equipment shall be stored only in those areas that are indicated as storage areas on the Contract Drawings and on the reviewed and accepted working drawings.

1. Store these items in a manner which will prevent damage and which will facilitate

inspection.
2. Leave seals, tags, and labels intact and legible.
3. Maintain access to products to allow inspection.
4. 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.

1. Any damaged or deteriorated materials must be replaced immediately to avoid delays in the project schedule.

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 work site that are subject to becoming windborne shall be ballasted or anchored.

## 3.2 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.

## 3.3 STORAGE

A. Store items in a manner that shall prevent damage to the DEN's property. Do not store hydraulic fluids, gasoline, liquid petroleum, gases, explosives, diesel fuel, and other flammables in excavations. Petroleum products and chemicals must be stored in closed containers within secondary containment.

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. Store incompatible materials separately.

F. Extra materials that are left over at the completion of the Work shall be removed from the Project site by the Contractor unless they are required to be delivered to DEN as per Contract Document requirements for maintenance stock.

3.4 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, bold lettering and conforming to OSHA requirements. Flammable substances shall be stored in flammable storage cabinets that conform to OSHA requirements.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

END OF SECTION 016610

# SECTION 017330 - CUTTING AND PATCHING

## PART 1 - GENERAL

A. RELATED DOCUMENTS

B. Drawings and general provisions of the Contract Documents.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by DEN.
5. Work under separate contracts.
6. Future work.
7. Purchase contracts.
8. DEN-furnished products.
9. Contractor-furnished, DEN-installed products.
10. Access to site.
11. Coordination with occupants.
12. Work restrictions.
13. Specification and drawing conventions.
14. Miscellaneous provisions.

B. Related Requirements:

1. Section 015210 "Temporary Facilities" for limitations and procedures governing temporary use of DEN's facilities.
2. Section 015719 "Temporary Environmental Controls" for environmental control requirements.
3. Section 024119 "Selective Demolition" for selective demolition of structures and other elements.
4. Section 099123 "Interior Painting" for interior painting of areas of cutting and patching.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction to permit installation of or to perform other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

## 1.4 SUBMITTALS

A. Cutting and Patching: The Contractor, during the weekly meetings will notify DEN Project Manager, at least two days prior to any cutting, with the procedure for the cutting and patching that will be performed. Notification does not waive right to later require removal and replacement of unsatisfactory work. The procedure shall include at least the following information:

1. Identification of the Contract and the Contractor's name.
2. Description of proposed work:
    a. Scope of cutting, patching, alteration, or excavation.
    b. The necessity for cutting or alteration.
    c. Drawing showing location of the requested cutting or alteration, along with radar or x-ray report.
    d. Trades that will execute the work.
    e. Products proposed to be used.
    f. Extent of refinishing to be done.
    g. Alternatives to cutting and patching.
3. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted and proposed dates of interruption of service. Additionally, verify and locate anything in or behind the area prior to cutting.
4. Proposed Dust Control and Noise Control Measures: Submit a statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
5. Effect on the work and other surrounding work or on structural or weatherproof integrity of Project.

## 1.5 QUALITY CONTROL

A. Operational Elements: Do not cut and patch ANY operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance, decreased operational life or safety unless approved by the DEN Project Manager. Operations elements may include, but are not limited to the following:

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire protection systems.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.
8. Operating systems of special construction as described in Divisions 13 and 26.
9. HVAC systems.

B. Miscellaneous Elements: Do not cut and patch ANY of the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or those results in increased maintenance, decreased operational life or safety unless approved by the DEN Project Manager. Miscellaneous elements may include, but are not limited to the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels and equipment.
6. Noise control and vibration control elements and systems.
7. Stud walls.
8. Roofing system

C. Visual Elements: Do not cut and patch ANY construction which results in an unsatisfactory visual aesthetic..

1. Visual elements may include, but are not limited to:

a. Stonework and stone masonry.
b. Ornamental metal.
c. Matched-veneer woodwork.
d. Preformed metal panels.
e. Firestopping.
f. Window wall systems.
g. Terrazzo.
h. Flooring.
i. Wall coverings and finishes.
j. HVAC enclosures, cabinets, or covers.

## 1.6 MATERIALS

A. General: All patching material shall be of the type specified for the material being patched. Comply with requirements specified in other specifications Sections.

B. Existing Materials: For exposed surfaces, use materials that visually and texturally match existing adjacent surfaces to the fullest extent possible.

# PART 2 - PRODUCTS (NOT USED)

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers. Provide additional substrates or materials if required to achieve desired final results of patching work.
2. Immediately notify the DEN Project Manager, in writing, of unsuitable, unsafe, or unsatisfactory conditions.
3. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
4. Proceed with patching only after construction operations requiring cutting are complete.

## 3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut to ensure structural value or integrity.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid or minimize interruption of services to occupied areas. Do not interrupt services in without approval from the appropriate authority. Refer to the appropriate Shutdown specification/procedures for applicable services.

## 3.3 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations. Reference Section 015719 "Temporary Environmental Controls" for requirements.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosures. Vacuum carpeted areas. Professionally clean carpeted areas if required.
3. For outdoor concrete saw cutting operations, slurry waste must be vacuumed up immediately to prevent migration off-site to pervious surfaces, surface waters or drains.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Concrete slurry waste must be disposed of properly in accordance with applicable airport, local and state rules and regulations.

C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to the condition existing before selective demolition operations began.

## 3.4 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Execute cutting and demolition by methods that will prevent damage to other work and will provide a proper surface to receive patching.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
2. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerance, and finishes.
3. Restore work that has been cut or removed; install new products to provide complete work in accordance with requirements of the Contract Documents.
4. Fit work airtight and fire safe to pipes, sleeves, ducts, conduit, and other penetrations through surfaces as required by the Contract Documents.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and other similar operations, including excavation, using methods least likely to damage elements retained to adjoining construction. If possible, review proposed procedures with original installer and comply with original installer's written recommendations.

1. In general, use ground fault hand or small power tools designed (to short if metal is hit) for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to the size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Use a cutting machine such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other specification Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: 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. For continuous surfaces, refinish entire unit

to the nearest break line. For an assembly, refinish entire unit.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs on a painted surface, apply primer and intermediate paint coats over the patch and apply the final coat over the entire unbroken surface containing the patch. Provide additional coats until the patch blends with adjacent surfaces.

4. Ceilings: Patch, repair or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

D. Fire Rated Construction: Where rated elements are cut, reconstruct to approved designs to provide original fire rating.

## 3.5 CORE DRILLING

A. The Contractor shall execute x-rays or ground penetrating radar (GPR) at each location planned for core drilling. The Contractor, during the weekly meetings will notify DEN Project Manager, at least two days prior to any core drilling, with the procedure for the core drilling that will be performed.The request for approval shall indicate on the x-ray or radar information regarding alternate locations or core drilling to avoid structural members and any embedded conduit. Embedded conduit may be metallic or plastic. The x-ray or radar system shall be capable of detecting both types of conduit.

B. X-ray activities may not be performed without an adequate safety barrier in any occupied areas. The Contractor shall provide all manpower and barriers required to secure the areas affected by x-ray activities. GPR will be allowed during hours of activity or occupancy as set forth in 3.5 (A).

# PART 4 - MEASUREMENT

## 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

# PART 5 - PAYMENT

## 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 017330

# SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

### 1.2 SUMMARY

A. This section describes the requirements for the disposal, recovery, reuse or recycling of non-hazardous and non-asbestos containing construction and demolition waste for both LEED and non-LEED projects. Note that LEED projects may have more specific requirements than identified in this section.

B. Waste materials shall be managed in accordance with all local, state, and federal regulations.

C. Related Requirements:
1. Section 015719 "Temporary Environmental Controls" for environmental control procedures.
2. Section 018113 "Sustainable LEED Requirements" for LEED requirements.
3. Section 024116 "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements[, and for disposition of hazardous waste].
4. Section 024119 "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements[, and for disposition of hazardous waste].
5. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.
6. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.
7. Also see the Contract Documents, including the Project Management Plan.

D. Developer shall pay for all sorting of Solid Waste, Salvage Materials, and Recycled Materials. See Agreement for disposal cost obligations by parties.

### 1.3 DEFINITIONS

A. Solid Waste: means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, air pollution control facility, or other discarded material; including solid, liquid, semisolid, or contained gaseous material resulting from industrial operations, commercial operations or community activities. Solid waste does not include any solid or dissolved materials in domestic sewage, or agricultural wastes, or solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under the provisions of the "Colorado Water Quality Control Act", Title 25, Article 8, CRS or materials handled at facilities licensed pursuant to the provisions on “Radiation Control Act” in Title 25, Article 11, CRS. Solid

waste does not include:

1. Materials handled at facilities licensed pursuant to the provisions on radiation control in Article 11 of Title 25, C.R.S.
2. Excluded scrap metal that is being recycled.
3. Shredded circuit boards that are being recycled.

B. Salvaged Materials: Defined as materials that exist on the site that can be reused, either on site or by another entity

C. Recyclable Materials: Defined as materials that exist on site or are generated during the construction process that can be recycled and/or remanufactured into another material. Recyclable waste includes, but is not limited to, the following:

1. Concrete.
2. Asphalt
3. Ferrous and non-ferrous metals.
4. Untreated wood, engineered wood.
5. Gypsum wallboard.
6. Corrugated cardboard, paper goods.
7. Plastic.
8. Glass, insulation.
9. Carpet.
10. Paints, fabric.
11. Rubber.
12. Stone and brick.

D. Hazardous Waste: Per 6 CCR 1007-3, those substances and materials defined or classified as such by the Hazardous Waste Commission pursuant to 25-15-302, C.R.S., as amended. Also, see hazardous waste definition per 40 CFR 261.3. See Agreement for contract requirements should this be encountered.

E. Asbestos Containing Materials: Per 5 CCR 1001-10: Regulation No. 8, The Control of Hazardous Air Pollutants, Part B: The Control of Asbestos- material containing more than 1% asbestos. See Agreement for contract requirements should this be encountered.

## 1.4 SUBMITTALS

A. The Contractor shall maintain an ongoing list of materials and products used with Safety Data Sheets (SDS).

B. The Contractor shall submit a Waste Management Plan to the DEN Project Manager and DEN Environmental Services. Minimum Waste Management Plan requirements include the following:

1. A list of all waste streams generated by the project

a. For each waste stream listed, the Contractor shall identify the

handling/transportation method, the disposal method, and the disposal facility utilized.

b. If the Contractor anticipates generation of hazardous waste, the Contractor shall provide its USEPA (generator) identification number.

2. Pollution Prevention Measures

a. Describe best practices that will reduce waste. For example, waste reduction measures, requiring vendors to deliver materials in reusable packaging, etc.

3. Waste Management Plan Training.
4. Storage of materials.
5. Spill response.

C. Approval of Contractor's Waste Management Plan does not relieve the contractor of responsibility for compliance with applicable environmental regulations.

1. The contractor shall maintain a record of the amounts of construction and demolition waste generated, recycled, reused, salvaged, or disposed of, in pounds for review.
2. Hauling manifest records shall be maintained and available for review. Manifest forms are available from the DEN Project Manager

## PART 2 - PRODUCTS

2.1 A list of all materials and products used. Examples include chemicals, solvents, solvents, fuels, curing compounds, etc.

A. Identify storage methods, including measures to segregate incompatible materials.

B. Refer to the Waste Management Plan

## PART 3 - EXECUTION

A. The Contractor shall not wash down equipment in such a manner as to flush grease, oils, detergents, and other contaminants onto the project site or onto airport property unless the waste is properly contained, treated, and disposed of.

B. DEN maintains two dry concrete and asphalt recycling yards used for the accumulation and crushing of asphalt and concrete. The South Yard is located on 71st Ave just east of Jackson Gap Street. The North Yard is located on the south side of 110th, west of Queensburg Street.

C. Concrete washwater cannot be discharged to surface waters or to storm sewer systems. Colorado Discharge Permit System (CDPS) coverage conditionally

authorizes discharges to the ground of concrete wash water from washing of tools and concrete mixer chutes when appropriate best management practices (BMPs) are implemented.

1. A bermed containment area that allows discharge water to infiltrate or evaporate;

    a. Alternatives to bermed containment areas include portable concrete washout bins, and industrial washout containment systems where the accumulated waste is removed from the site and disposed of properly.

2. Use of the washout site should be temporary (less than one year);
3. The washout site should not be located in an area where shallow groundwater may be present, such as near natural drainages, springs, or wetlands
4. Upon termination of the washout site, accumulated solid waste, which includes concrete waste and contaminated soils, must be removed from the site and disposed of properly.

D. Rejected loads and/or other wet concrete or asphalt materials are PROHIBITED TO BE PLACED ANYWHERE on DEN property. These materials must be returned to the facility of origination or other permitted facility for proper disposal.

E. Concrete saw cutting slurry must be properly contained and disposed of.

F. Unknown or questionable materials encountered during construction activities, must immediately be reported to the DEN Communications Center at (303) 342-4200 and the DEN Project Manager.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 017419

# SECTION 017420 - CLEANING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

### 1.2 SUMMARY

A. The Work specified in this section consists of maintaining a clean, orderly, hazard free work site during construction, and final cleaning for the City's Final Acceptance and phased TCO.

B. This section applies during construction, at phased TCO and at prior to the issuance for the Certificate of Final Acceptance.

### 1.3 JOB CONDITIONS

A. Safety Requirements

1. Maintain the work site 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, work site walks, sidewalks, roadways, and streets, along with public and private walkways adjacent to the work site, free from hazards caused by construction activities. Inspect those facilities regularly for hazardous conditions caused by construction activities.

B. Hazards Control:

1. Store waste materials in properly labeled waste containers. This includes solid wastes, hazardous wastes, universal wastes, etc.
2. Store volatile wastes in covered metal containers and remove those wastes from work site daily.
3. Do not accumulate wastes that create hazardous conditions.
4. If volatile and noxious substances are being used in spaces that are not naturally ventilated adequately, provide artificial ventilation.
5. Hazard controls shall conform to the applicable federal, state, and local rules and regulations.
6. 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.

C. Access:

1. Maintain the work site to permit access in accordance with the Contract Documents.

## 1.4 SUBMITTALS

A. Washing Plan: The Contractor shall prepare a plan describing the specific procedures and materials to be utilized for any equipment, vehicle, etc., washing activities. The plan must be submitted to the DEN Project Manager and approved by the DEN Project Manager and Environmental Services.

1. Outdoor washing at DEN is not allowed unless the materials will be collected or managed in a manner to ensure that they will not enter the municipally owned separate storm sewer system (MS4). The materials can only be disposed at a location pre-approved by DEN Environmental Services (refer to Developer's SWMP). Failure to comply with this requirement would result in the discharge of non-stormwater.

    a. Outdoor wash materials that contain soaps or other cleaning chemicals must be collected and disposed of off site

2. Indoor washing must be conducted in accordance with the Best Management Practices (BMPs) detailed in the DEN SWMP. Refer to Section 015719 "Environmental Controls". In addition, all indoor washing must be conducted in a manner that ensures that there are no prohibited discharges to the sanitary sewer system.

    a. All wash-water that will be disposed of into the sanitary sewer must comply with City and County Denver rules and regulations pertaining to prohibited discharges.

# PART 2 - PRODUCTS

## 2.1 CLEANING MATERIALS

A. Utilize the type of cleaning materials recommended by the manufacturer for the surfaces to be cleaned.

B. Maintain current Safety Data Sheets (SDS) on site for all chemicals. DEN Environmental Services must approve the chemicals used prior to discharge to the sanitary sewer system.

C. Ensure proper disposal of all wastes generated from the use of these materials. The Contractor must ensure compliance with all environmental regulations. No wastes can be disposed of on DEN property.

## PART 3 - EXECUTION

### 3.1 INTERIM CLEANING

A. Clean the work site for the duration of the construction Contract. Maintain structures, grounds, storage areas and other areas of work site, including public and private properties immediately adjacent to work site, free from accumulations of waste materials caused by construction operations. Place waste materials in covered metal containers.

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 work site 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, public rights of way, or on the Denver International Airport site.

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.

M. Dispose of all fluids according to the approved Washing Plan.

### 3.2 FINAL CLEANING

A. The Contractor, shall at a minimum, complete the following:

1. Inspect interior and exterior surfaces, including concealed spaces, in preparation

for completion and acceptance.

2. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains, and extraneous markings.
3. Remove surplus materials, except those materials intended for maintenance.
4. Remove all tools, appliances, equipment, and temporary facilities used in the construction.
5. Remove detachable labels and tags. File them with the manufacturer's specifications for that specific material for the City's records.
6. Repair damaged materials to the specified finish or remove and replace.
7. 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.
8. Final cleanup applies to all areas, whether previously occupied and operational or not.
9. Dispose of all fluids according to the approved Washing Plan.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION **017420**

# SECTION 017515 - SYSTEM STARTUP, TESTING AND TRAINING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Provide complete startup, testing, and operator training services to ensure operability of all systems supplied.

B. Coordinate all start-up and testing with DEN Commissioning Authority or DEN Asset Management through the DEN Project Manager.

### 1.3 SUBMITTALS

A. Submit the following:

1. Test procedures.
2. Test reports.
3. Training outline.

B. Submit Qualification Data: For individual(s) performing the system startup/testing/training, confirming the manufacturer's approval.

C. Attendance Record: For each training module submit the following:

1. Module title
2. Module description
3. Length of instruction time
4. Participant names

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

### 1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.

B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required. Recordings

shall be high-resolution with a minimum framerate of 60Hz.

C. Pre-instruction Conference: Conduct conference at Project site in accordance with the methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructor's personnel, audiovisual equipment, and facilities needed to avoid delays. Ensure that students are notified at least 7 days prior to the start of instruction.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.5 COORDINATION

A. Coordinate instruction schedule with DEN's operations. Adjust schedule as required to minimize disrupting DEN's operations and to ensure availability of DEN's personnel. As required, include multiple classed to accommodate various shifts

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by DEN Project Manager.

# PART 2 - PRODUCTS (NOT USED)

# PART 3 - EXECUTION

## 3.1 FIELD TESTS AND ADJUSTMENTS

A. All electrical and mechanical equipment including the interfaces with control systems and the communication system, and all alarm and operating modes for each piece of equipment, shall be tested by the Contractor before any facility is put into operation. Tests shall be as specified herein and shall be made to determine whether the equipment has been properly assembled, aligned and connected. Any changes, adjustments, or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the Work.

1. At least thirty (30) days before the time allowed in the construction schedule for commencing startup and testing procedures, the Contractor shall submit to the DEN Project Manager six (6) copies of the detailed procedures the Contractor proposes for testing and startup of all electrical and mechanical equipment.

These procedures are submitted for review and acceptance by DEN.

2. The Contractor's startup and testing procedures shall include detailed descriptions of all pre-operational hardware, electrical, mechanical and instrumentation used for testing work.

    a. Each control device, item of electrical, mechanical and instrumentation equipment, and all control circuits shall be considered in the testing procedures which shall be designed in a logical sequence to ensure that all equipment has been properly serviced, aligned, connected, wired, calibrated and adjusted prior to operation.
    b. Motors shall be tested in accordance with ANSI/IEEE Publication 112. The Contractor is advised that failure to observe these precautions may place the acceptability of the subject equipment in question, and the Contractor may be required to demonstrate that the equipment has not been damaged.

3. Testing procedures shall be designed to duplicate as nearly as possible all conditions of operations and shall be carefully selected to ensure that the equipment is not damaged. All filters shall be in place during startup and testing.

    a. Once the DEN Project Manager has accepted the testing procedures, the Contractor shall provide checkout, alignment, adjustment and calibration signoff forms for each item of equipment and each system that will be used.
    b. The Contractor and the DEN Project Manager shall use the signoff forms in the field jointly to ensure that each item of electrical, mechanical and instrumentation equipment and each system has been properly installed and tested. The Contractor shall cooperate with project-wide systems contractors where startup and testing is to be conducted concurrently.

4. Any special equipment needed to test equipment shall be provided by the Contractor to the City at no cost for a period of thirty (30) days during startup.

B. Before starting up the equipment, the Contractor shall properly service it and other items, which normally require service in accordance with the maintenance instructions. The Contractor shall be responsible for lubrication and maintenance of equipment and replacement filters throughout the entire equipment “break-in” period described by the manufacturer.

1. The Contractor shall be responsible for the startup, adjustment, preliminary maintenance, and checkout of all equipment and instrumentation. All systems shall be carefully checked for conformance with the design criteria.
2. If any equipment or system does not operate as specified in the Contract, the Contractor shall immediately replace or repair components until it operates properly.
3. The Contractor shall submit a test report to the DEN Project Manager within thirty (30) days after completion of the system startup period.

## 3.2 SYSTEMS STARTUP AND TESTING

A. The Contractor shall be responsible for a 30-day startup period during which time all hardware, electrical and mechanical equipment, communications, alarm systems, and associated devices shall be energized and operated under local and automatic controls. The Contractor shall be present during the startup period with adequate labor and support personnel to adjust equipment and troubleshoot system failures that might arise.

B. When a piece of electrical or mechanical equipment is found to be in conflict with specific criteria, an experienced representative of the manufacturer shall adjust the item.

C. If adjustments fail to correct the operation of a piece of equipment or fixture, the Contractor shall remove the equipment or fixture from the Project site and replace it with a workable replacement that meets the specification requirements.

D. The 30-day startup period shall commence thirty (30) days prior to the Contract completion date and shall be completed prior to final payment. If, during the startup, any system fails to operate in accordance with Contract requirements, the failure shall be corrected.

1. At the end of the startup period, all filters shall be replaced with new ones.
2. The City may provide, at its option, a Commissioning Representative to observe or participate in the startup and testing of any system. The Contractor shall coordinate with the Commissioning Representative relating to scheduling, reporting, forms, methods, and procedures of the startup and testing.

**PART 4 - FINAL INSTRUCTIONS AND OPERATION TRAINING** (See also 017900 – Demonstration and Training)

A. After startup and testing is completed, the Contractor shall demonstrate to the City's personnel the proper manner of operating the equipment, programming messages, making adjustments, responding to alarms and emergency signals, and maintaining the system.

B. The Contractor shall provide on-the-job training by a suitably qualified instructor to designated personnel and shall instruct them in the operation and maintenance of the systems. In the event qualified instructors on the Contractor’s staff are not available, the Contractor shall arrange with the equipment manufacturer for such instruction at no additional cost to the City.

C. The Contractor shall provide a minimum of eight (8) hours of operator training to the Airport per shift. Classes shall accommodate up to five (5) people at a time with up to two (2) separate courses (one for each shift).

D. The Contractor shall provide a syllabus to the DEN Project Manager at least seven (7) calendar days prior to the start of each course that outlines topics to be covered, the proposed

time allotted to each topic, and the target audience of the training session (technical, casual operator, overview, etc.). The Contractor shall not commence any training courses until the syllabus has been reviewed and approved by the DEN Project Manager.

E. Verify that all formats noted below are most currently used by DEN.

F. The Contractor shall video record all training sessions and provide to the DEN Project Manager. The Contractor shall provide video recordings in format as required in Section 017900 "Demonstration and Training".

G. The Contractor shall provide an annotated syllabus to the DEN Project Manager that indicates topics contained on each tape.

H. The contractor shall provide instruction for obtaining live help for questions relating operation and troubleshooting

## PART 5 - MEASUREMENT

5.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 6 - PAYMENT

6.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

B. No contractual item requiring startup or testing will be paid until the conditions of this Section are completely satisfied.

END OF SECTION 017515

# SECTION 017720 - CONTRACT CLOSEOUT

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

### 1.2 SUMMARY

A. Work specified in this Section includes procedures required prior to Final Acceptance of the Work.

B. This Section also includes procedures and penalties to ensure prompt completion of the Project Closeout.

C. Related Sections:

1. Title 20 of the General Contract Conditions, 2011 Edition.
2. Section 017840 "Contract Record Documents" for required record documents.
3. Development Agreement Article 5.10 “Project Substantial Completion and Project Final Acceptance”

D. SUBMITTALS

1. Submit written Certification to the DEN Project Manager that, in the opinion of the Contractor, the Work is complete. Form CM-75, Closeout Checklist

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 PREPARATION FOR FINAL INSPECTION

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

B. The Contractor shall ensure that all items on the Closeout Checklist have been addressed and accepted by the DEN Project Manager.

### 3.2 FINAL INSPECTION

A. The Developer shall submit written certification to the DEN Project Manager when, in the opinion of the Developer, the Work is complete. Such communication shall certify

that:

1. The Work has been inspected by the Contractor for conformance with the Contract Documents.
2. The Work has been completed in conformance with the Contract Documents, including all punchlist items.
3. The Work is ready for final inspection by the Owner.
4. All as-built documents have been submitted.
5. All damaged or destroyed real, personal, public, or private property impacted by the Work has been repaired or replaced.
6. All Warranties and Bonds have been completed, executed, submitted, and accepted.
7. All personnel badges and vehicle permits will be returned to DEN Airport Security per the DEN Rules and Regulations.

B. The DEN Project Manager will inspect the Work in accordance with the Quality Management Plan.

C. If the DEN Project Manager finds incomplete or defective Work:

1. The DEN Project Manager will notify the Contractor in writing, listing the incomplete or defective Work which should be included in the Contractor's punchlist.
2. The Contractor shall take immediate steps to remedy all identified deficiencies and resubmit a written certification to the DEN Project Manager that Work is complete.
3. The DEN Project Manager will then re-inspect the Work.

## PART 4 - MEASUREMENT

### 4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

### 5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 017720

# SECTION 017825 - OPERATION AND MAINTENANCE DATA

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. All requirements are set forth in the Operation and Maintenance section of the Contract Documents.

END OF SECTION 017825

# SECTION 017835 - WARRANTIES AND BONDS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents, including:

a. CM-10: Contractor Warranty
b. CM-11: Contractor/Sub-Contractor Warranty
c. Development Agreement 5.16, “Warranty Work”.

END OF SECTION 017835

# SECTION 017840 - CONTRACT RECORD DOCUMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

1. DSM General Standards and Criteria Chapters 9 and 32.

### 1.2 SUMMARY

A. The Work specified in this Section consists of maintaining, marking, recording, and submitting Contract record documents that include shop drawings, warranties, Contract Documents, and contractor records.

B. Refer to DEN Building Information Modeling (BIM) Design Standards Manual (DSM) and Approved BIM execution for data format and file types acceptable for different type of data.

C. Related Requirements:

### 1.3 SUBMITTALS

A. Each submittal of record documents shall contain the following information:

1. Date.
2. Project title 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 the Contractor's authorized representative.

B. As-built Construction Drawings will be uploaded to Aconex on regular basis.

1. The Developer shall provide a single electronic copy of each Contract drawing sheet which has been used to produce work

a. The Developer must show as-built work completed including but not limited to utilities, empty conduit, conduit for actual electrical lines, plumbing, HVAC, location of anchor bolts and support points for use by others.
b. All markings on drawings shall be legible to identify the portion of work completed.
c. For projects utilizing BIM system by the Contractor or a consultant of the Contractor, all data formats shall be compatible and as approved by the BIM execution plan as required in the DEN BIM DSM.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 MAINTENANCE OF DOCUMENTS

A. The Contractor must follow all the procedures established in the Contract Documents and DEN BIM DSM.

B. The Developer shall maintain an electronic copy at the work site on a current basis one (1) 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.

C. Maintain an electronic copy 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.

2. Contractor Records:

    a. Daily Quality Control Reports.
    b. Certificates of compliance for materials used in construction.
    c. Completed inspection list.
    d. Inspection and test reports.
    e. Test procedures.
    f. Qualification of personnel.
    g. Approved submittals.
    h. Material and equipment storage records.
    i. Safety Plan
    j. Erosion, sediment, hazardous and quality plans.
    k. Hazardous material records.
    l. First report of injuries.

### 3.2 RECORDINGS

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 specifications and Contract Drawings to record:
    1. Changes made by change orders, requests for information, substitutions, and

variations approved by submittals.

3.3 DOCUMENT MAINTENANCE

A. Follow all the required processes of the approved BIM Execution Plan as approved by DEN for this specific project or in formats acceptable to DEN BIM management system.

B. Do not use record documents for construction purposes.

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

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 017840

# SECTION 017900 - DEMONSTRATION AND TRAINING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract Documents.

### 1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing City's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

### 1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructor's names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: A factory authorized service representative, experienced in operation and maintenance procedures and training.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

### 1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit 2 copies within 7 days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Closed Caption: Videos shall contain a visible text version of all speech provided in the recording.
3. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
4. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
5. At completion of training, submit complete training manual(s) for City's use in PDF electronic file format.

## 1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A professional instructor/trainer who is experienced in operation and maintenance procedures and training.

B. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 014510 "Contractor Quality Control". Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructor's personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.6 COORDINATION

A. Coordinate instruction schedule with City's operations. Adjust schedule as required to minimize disrupting City's operations and to ensure availability of City's personnel.

1. Include multiple classes to accommodate various shifts, as necessary.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by DEN Project Manager.

## PART 2 - PRODUCTS

### 2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.

e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017825 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

### 3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and City for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct City's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Contractor will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. City will furnish an instructor to describe City's operational philosophy.
3. DEN Project Manager will furnish Contractor with names and positions of DEN participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with City, through DEN Project Manager, with at a minimum of 14 days advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document the performance of the presenter.

F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Recordings: Submit video recordings in an electronic format acceptable to DEN Project Manager. Recordings shall be high-resolution with a minimum framerate of 60Hz

1. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
2. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by **audio narration by microphone while** or **dubbing audio narration off-site after** video recording is recorded. Include description of items being viewed.

1. Closed Caption: Videos shall contain a visible text version of all speech provided in the recording.
2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents

with links to corresponding training components. Include name of Project and date of video recording on each page.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Failure of Video Recordings: If video recordings submitted by Contractor do not comply with Project requirements, or have audio and/or video problems, Contractor will be required to repeat training and video recording in compliance with this Section in order to re-create the training video.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section.

END OF SECTION 017900

# SECTION 018113.19 - SUSTAINABLE DESIGN REQUIREMENTS - LEED FOR CORE AND SHELL DEVELOPMENT

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED Gold certification based on USGBC's "LEED 2009 for Core and Shell Development."

1. Other LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
2. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

### 1.3 DEFINITIONS

A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

B. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

C. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Respond to questions and requests from the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the project's LEED certification application. Document responses as informational submittals.

1.5 ACTION SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

1.6 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

## PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated.

2.2 SALVAGED, REFURBISHED, AND REUSED MATERIALS

A. A goal of not less than 5 percent of building materials (by cost) shall be salvaged, refurbished, or reused materials.

2.3 LOW-EMITTING MATERIALS

A. For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with the following VOC content limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

## PART 3 - EXECUTION

3.1 REFRIGERANT REMOVAL

A. Remove CFC-based refrigerants from existing HVAC&R equipment indicated to remain and replace with refrigerants that are not CFC based. Replace or adjust existing equipment to accommodate new refrigerant as described in HVAC Sections.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Comply with Section 017419 "Construction Waste Management and Disposal."

3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."

1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 015000 "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
2. Replace all air filters immediately prior to occupancy.

## PART 4 - MEASUREMENT

4.1 METHOD OF MEASUREMENT

A. No separate measurement shall be made for work under this Section.

## PART 5 - PAYMENT

5.1 METHOD OF PAYMENT

A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Lump Sum Contract price.

**END OF SECTION 018113.19**

## SECTION 019113 - GENERAL PRE-COMMISSIONING REQUIREMENTS

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Technical Requirements: All equipment, components, systems, etc., to be Commissioned will be confirmed in the Pre-Commissioning Plan produced by the Developer and reviewed by the Owner.

B. Specification Sections:

1. See Technical Requirements I.10.19, “Pre-Commissioning Plan (Pre-Cx)”

1.2 SUMMARY

A. Scope

1. Developer to assist Owner and Owner’s Commissioning Authority (CxA) as specified in the Technical Specifications and as identified in the Technical Requirements I.10.19 “Pre-Commissioning Plan (Pre-Cx)”
2. Systems and equipment pre-functional performance testing
3. Systems and equipment functional performance testing
4. Validation of proper and thorough installation of systems and equipment
5. Equipment performance verification with Engineer of Record and related manufacturers of the systems/equipment
6. Provide all documentation of tests, procedures, and observations as required for the Pre-Commissioning Plan

1.3 DEFINITIONS (As applies to Division 1-33 and not conflicting with the Development Agreement Appendix #1)

A. Acceptance Phase: The phase of the project when the facility and its systems and equipment are inspected, tested, verified, and documented; and when most of the Functional Performance Testing and formal training occurs. This will generally occur after the Construction Phase is complete (start-up and checks have been accomplished).

B. Commissioning Authority (CA or CxA): The Party retained by the Owner who will oversee the Commissioning process as well as develop and stipulate many of the Commissioning requirements. They will also manage the Commissioning process, and ensure and validate that systems and equipment are designed, installed, and tested to meet Owner’s requirements.

C. Pre-Commissioning Contact (CxC): Individuals, appointed by the installing contractor, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process

through coordinated action.

D. Commissioning Plan (Cx): A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

E. Construction Phase: Phase of the project during which the facility is constructed and/or systems and equipment are installed and started. Contractor and subcontractors complete the installation, complete start-up documentation, submit operation and maintenance information, establish trends, and perform any other applicable requirements to get systems started. Contractor and Vendors may also conduct equipment specific training.

F. Contractor: As used herein, 'Contractor' is a general reference to the installing Party and can therefore refer to the Developer, General Contractor, subcontractors, or vendors as inferred by its usage.

G. Deficiency: A condition in the installation or function of a component, piece of equipment or system that does not comply with the Contract Documents, i.e., does not perform properly or is not complying with the design intent.

H. Energy Management Control System (EMCS): The computer-based heating, ventilation and air-conditioning (HVAC) control system.

I. Factory Authorized Representative: An individual fully trained on the equipment and certified by the manufacturer to perform the respective task.

J. Factory Testing: Testing of equipment off-site at the manufacturer's facility. The testing may be witnessed by the members of the project team.

K. Functional Performance Testing (FPT): The detailed and thorough testing of building systems and their interactions with building components and other building systems.

L. CxA Issues Log: This list is maintained and updated by the Commissioning Authority that includes all Issue items that relate to Commissioning activities and site observations requiring contractor action or response.

M. Maximum Failure Limit: The maximum percentage of a test population that is permitted to fail before the test is considered a failure and subject to correction and retesting. Where test sampling is used, the Maximum Failure Limit shall be the maximum percentage of a test sample that is permitted to fail before an entirely new sample must be selected for testing.

N. Operation and Maintenance (O&M) Documentation: Contractor-developed documentation designed to address the needs of facilities personnel and customized for the context of the specific facility and installation. This includes manufacturer's literature (including O&M manuals, parts lists, troubleshooting guides, etc.), Contractor-developed instructions for start-up and shut-down, control sequences, and other installation-specific information.

O. Pre-Start Up: Preliminary testing accomplished during a scheduled system outage to verify system functionality prior to placing the system/equipment into preliminary service.

P. Start-Up: Refers to the quality control process whereby the Contractor verifies the proper installation of a device or piece of equipment, executes the manufacturer's starting procedures, completes the Start-Up Checklist, energizes the device, verifies that it is in proper working order and ready for dynamic testing, including Start-Up Tests.

Q. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

R. Test, Adjust, and Balance (TAB): Refers to the test, adjust, and balance process or the Testing, Adjusting, and Balancing Contractor.

S. Trending: Monitoring and recording a history of parameters typically using the EMCS.

## 1.4 ACTION SUBMITTALS

A. CxA provided submittals to Developer and Owner:

1. Commissioning Plan.
2. Pre-functional checklists: For each system or component.
3. Startup procedures: For each system or component.
4. Startup checklists: For each system or component.
5. Completed startup checklists: For each system or component.
6. Functional Test Procedures: For each system or component.
7. Functional Test Checklists: For each system or component.
8. Formal acceptance recommendation for each component or system tested, following successful completion of testing.

B. Developer/Contractor submittals to Owner and CxA:

1. Completed data for pre-functional checklists: For each system or component.
2. Completed startup checklists: For each system or component and manufacturer verification of procedure/limits.
3. Completed functional test checklists: For each system or component and manufacturer verification of procedure/limits.

## 1.5 INFORMATIONAL SUBMITTALS (to Owner and Developer)

A. CxA submittals to Owner and Developer (For Information Only):

1. Contact Information: CxA name and contact information
2. Test equipment calibration certificates.

3. Preliminary Commissioning Report, including the following:

    a. Compiled test results.
    b. Updated Issues Log.
    c. Updated Checklist log.

4. Final Commissioning Report, including the following:

    a. Compiled test results.
    b. Seasonal test results.
    c. Warranty walkthrough results.
    d. Completed issues log.
    e. Completed checklist log.

## 1.6 COMMISSIONING TEAM

A. Members Appointed by Developer/Contractor(s):

1. Developer/Contractor shall appoint a CxC.
2. The commissioning team shall consist of, but not be limited to, representatives of Developer/Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner’s Project Manager:

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of DEN Sustainability, Owner’s Project Manager Representative, and DEN Maintenance personnel.

## 1.7 Owner's RESPONSIBILITIES

A. Assign Owner’s Sustainability and Operations Maintenance personnel and schedule them to participate in commissioning team activities.

## 1.8 DEVELOPER/CONTRACTOR'S RESPONSIBILITIES

Developer/Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Include Commissioning and Pre-Commissioning requirements in price and plan for work.
2. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

3. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
4. Attend commissioning team meetings held on a variable basis and progressing to weekly meetings as construction project nears completion.
5. Integrate and coordinate commissioning process activities with construction schedule.
6. Review and accept construction pre-functional checklists provided by the CxA prior to commencing functional testing.
7. Review and accept commissioning process functional test procedures provided by the Commissioning Authority.
8. Designate a CxC from each major subcontractor with activities related to commissioning. These CxCs are to be the primary contacts for Commissioning and Pre-Commissioning activities.

9. Assist the CxA in preparation for the specific FPT procedures. Contractors, subcontractors, and vendors shall review the FPTs to ensure feasibility, safety, and equipment protection and provide necessary written alarm limits to be used during the tests. Damage caused to equipment performed in accordance with the approved procedures that is the result of malfunctioning equipment or contract deficiencies, shall be the responsibility of the Contractor.
10. Record start-up and testing procedures.
11. Demonstrate the operation of all systems as specified.

    a. Operate systems, with assistance of DEN Maintenance, under direction of the CxA during FPT’s and other acceptance testing.

B. Acceptance Phase: The following delineates the commissioning-related responsibilities of the Contractor (and their subcontractors) during the Acceptance Phase.

1. Work in conjunction with CxA in pre-functional, functional performance testing and integrated system testing.,

2. Correct any work not in accordance with Contract Documents.
3. Maintain record documentation and update and resubmit it after Functional Completion.

## 1.9 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team through the entire project.

B. Provide and update to commissioning plans as required to reflect the as-built equipment and systems.

C. Convene commissioning team meetings to discuss commissioning activities and current issues and resolutions.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Review all pertinent equipment submittals, shop drawings, and O&M documentation.

F. Verify the execution of commissioning process activities. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the Sequence of Operation (SOO). When a requirement is not met, the CxA will report the failure in the Issues Log.

G. Prepare and maintain the Issues Log.

H. Prepare and maintain completed construction checklist log.

I. Organize and lead the functional, seasonal, any LEED required tests, and 11-month Warranty review in the presence of the contractor, DEN Maintenance, and Owner's PM assigned personnel.

J. Witness systems, assemblies, equipment, and component startup.

K. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

## 1.10 ISSUES LOG

A. CxA shall maintain an Issues Log (required information, identified deficiencies, work required, etc.) that relates to Commissioning and Pre-Commissioning. Each item shall be tracked with the initiator, the parties responsible, due date, the date of closure, and a description of the resolution. Each item shall be categorized for sorting and tracking and for documentation on applicable forms.

B. CxA will provide this list to the Owner's Project Manager and Developer during regular project meetings as appropriate to keep all parties informed.

C. All parties indicated as responsible for an action item shall respond to the Owner's Project Manager. Responses are due within 10 days of action items being identified to the team.

## 1.11 PRE-START UP (by Developer/Contractor's)

### A. PREREQUISITES

1. All equipment, components, and devices applicable to the Pre-Start Up must be installed, and the Pre-Start Up must be documented and approved. This includes installation, identification labeling, insulation, and all other requirements for placing systems into dynamic operation.

### B. COMMON ELEMENTS

1. Required submittal documentation shall be present and located convenient to testing area.

2. Contractor shall submit the completed Pre-Start Up Procedures at least 10 days prior to the start of Functional testing. CxA shall review the Pre-Start Up Procedure documentation at the beginning of Start Up. Contractor shall demonstrate to Owner's Project Manager, DEN Maintenance and DEN Sustainability that access is sufficient to perform required maintenance.
3. System and equipment configurations shall be compared against the contract documents.

1.12 INSTRUMENTATION (by Developer/Contractor's)

A. All test instruments described in this section shall be acceptable for any portion of the commissioning process herein described.

B. All instruments shall conform to the standards specified in the most recent edition of "NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" in regard to accuracy and calibration status. Current calibration certificates must be available to the CxA if requested.

C. Test instrument accuracy and resolution must match or exceed that of the system component being verified or calibrated.

D. Test instruments must be used within guidelines as recommended by instrument manufacturer. All measuring methods must be appropriate to the instrument application and measurements must be repeatable under equivalent conditions.

E. Standard Testing Instrumentation: Standard instrumentation normally used for performance assessment and diagnosis shall be provided by testing entity. These include, but are not limited to:

1. Electronic Manometer (for Air and Flow Hood)
2. Electronic Manometer (for Water)
3. Temperature Instruments
4. Pressure instruments
5. Humidity Instruments
6. CO2 Instrument
7. Sound Meter
8. Electronic Multimeter
9. Tachometer
10. Ultrasonic Flow Meter
11. Others as required

1.13 START-UP (by Developer/Contractor's)

A. Prerequisites

1. All equipment, components, and devices applicable to the FPT must be started, and the Start-Up must be documented and approved. This

includes completion of Start-Up Procedures, pressure testing (of equipment, duct and piping), flushing/cleaning, identification labeling, insulation, and all other requirements for placing systems into dynamic operation.

2. Unless specifically agreed to by Owner and CxA, all support systems shall be complete prior to FPT.
3. The CxA shall determine the optimal sequence of testing.

B. Common Elements

1. Required submittal documentation shall be present and located convenient to testing area. Validate that all required documentation has been submitted and complete per the contract requirements.
2. Contractor shall provide the completed Start-Up Procedures, consistent with manufacturer's guidelines, at the time of testing. CxA shall review the Start-Up Procedure documentation and spot-check at the beginning of FPT.

C. Procedure (collaboration between CxA and Developer/Contractor's)

1. Purpose:

    a. Verify adherence to, and documentation of, quality control processes involved with preparing systems and equipment for operation.
    b. These procedures shall be performed on all installed systems and equipment and no sampling strategy is used for the start-up process.
    c. The Commissioning and Pre-Commissioning process requires all Parties to collaborate to establish the optimal standard of care for starting systems and equipment.
    d. After the procedures are established, the Contractor performs them and documents them with the Start-up Procedures that are developed by the Contractor.

2. Start-Up Procedures: The content of these Start-Up Procedures shall provide the minimally acceptable content in accordance with the OEM field quality control requirements. Generic refers to the fact that the protocols may be created before the shop drawings are finalized. These procedures and protocols will normally be common across different manufacturers.
3. Content of Start-Up Procedures: Start-Up Procedures shall generally include the following for each item of equipment or system (as applicable):

    a. Project-specific designation, location, and service.
    b. Indication of the Party performing and documenting the Start-Up Procedure.
    c. Clear explanation of the inspection, test, measurement, and outcome with a Pass/Fail indication and a record of measure parameters.

d. A Start-up Checklist item indicating that proper maintenance clearances have been maintained.

4. Recording and Documentation of Factory Start-Up: Manufacturer's start-up protocols shall be executed and forms shall be completed by a qualified/authorized technician.
5. Recording and Documentation of non-Factory Start-Up: The start-up tests and checklists shall be completed by a qualified technician.
6. Commissioning Authority Review: CxA will review and spot-check procedures during FPT.
7. Documentation Completion: The individual executing the start-up must complete the start-up and pre-functional documentation for any given equipment and acknowledge acceptability with the indication of who did the associated task.
8. Sampling and Final Submission: All (100% of) systems are started and documented per the approved procedures and NO sampling strategy is used. Completed Start-up and pre-functional checklists for all pieces of equipment associated with independent systems shall be submitted to CxA prior to any associated FPT. Any outstanding item shall be clearly indicated and an associated Action Item must be entered to track resolution.
9. Owner Access: Contractor shall allow access by Owner's representatives to inspect the equipment and ensure its proper operation.

## 1.14 TEST, ADJUST, AND BALANCE

A. CxA shall review TAB reports.

B. The CxA shall select up to 10% of the readings from the Balancing Reports and verify performance readings. Readings selected by the CxA may include:

1. Supply air diffuser readings (both minimum and maximum readings for variable air volume boxes).
2. Main and branch supply duct traverse readings.
3. Outside/return air flow readings.
4. Exhaust airflow readings.
5. Water flow readings.
6. Ampere readings.
7. Water pressure drop readings through coils, heat exchangers, and other hydronic elements.

C. For all readings, a deviation of more than 10% between the verification reading and reported data shall be considered as failing the FPT. The maximum failure rate for the sample is 10%.

D. If greater than 10% of sample readings have failed, the TAB contractor shall justify all noted failures or rebalance and re-document the system.

## 1.15 FUNCTIONAL PERFORMANCE TESTING (FPT)

A. Objectives and Scope

1. Demonstrate that each system is operating according to the documented design intent and Contract Documents.
2. Bring all commissioned systems from a state of substantial completion to full dynamic operation.
3. Identify and correct performance deficiencies.
4. Operate each system through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, normal and emergency power, fire alarm, part- and full-load) where there is a specified system response.
5. Verify each sequence in the sequences of operation as required.
6. Verify responses to abnormal operational modes and conditions, such as power failure, freeze conditions, no flow, equipment failure, etc...

B. Development of Test Procedures

1. CxA shall develop specific test procedures to verify and document proper operation of each piece of equipment and system, but in all cases within the limits identified by the manufacturers.
2. CxA shall develop fill-in forms for use during FPT, based on the test procedures.
3. Not less than 14 days prior to execution of FPT, CxA shall submit completed test procedures to the Owner's Project Manager to review the tests for feasibility, safety, equipment and warranty protection, and scope.
4. EMCS trends shall have been established as required in the documents. These shall generally be reviewed prior to or during FPT.
5. Capacities and adjusted/balanced conditions as applicable shall be subject to review.
6. Sequencing Verification: For applicable systems and equipment, all modes of operation shall be verified for proper sequencing.
7. System and equipment configurations shall be compared against the contract documents.
8. All adjusted, balanced, controlled systems shall be assessed to determine the optimal setting for the system as applicable. The optimal settings should be determined to establish reliable, efficient, safe, and stable operation.

C. Scheduling:

1. Contractor shall notify the CxA and the Owner's Project Manager that systems are ready for testing, to schedule FPT.
2. To the extent practical, tests shall be scheduled to allow efficient and contiguous testing of inter-related systems and equipment.

D. Phasing:

1. Non-interdependent segments of the project testing may be phased.
2. Phasing of FPT for this project shall be coordinated between the CxA, Contractor, and the DEN Project Manager as the project progresses.

E. Participation:

1. CxA shall witness and document FPTs performed by the contractor after Start-Up Procedure documentation of systems and equipment has been reviewed and accepted.
2. Developer/Contractor shall perform the FPTs as described, with manipulation of the systems or equipment, provision of supporting equipment or materials (lifts, ladders, specialty test equipment, safety equipment), and on-the-spot remediation of minor identified deficiencies whenever possible.
3. Required participating Parties shall be indicated in the test plan for each individual FPT.
4. Required participating parties shall be available on-site throughout the testing of any given system for which they are required participants.
5. CxA shall coordinate effectively with the individual Contractors throughout FPT and minimize their required involvement.

F. Completeness:

1. All systems must be completed and ready for FPT at the time of the test.
2. All start up, factory authorized field testing, independent testing agency tests, and TAB procedures must be complete and the control systems must be tested and operational for the respective system or component.

G. Test Documentation:

1. CxA shall witness and document the tests.
2. CxA shall record all test results on the forms developed for the testing.
3. CxA shall ‘Pass’ or ‘Fail’ the testing and record the date and time of the test.
4. Deficiencies shall be clearly indicated when the test is failed.
5. When all related testing is completed successfully, CxA shall recommend acceptance of the system or component.
6. In the case of specialized testing, CxA shall witness and review the testing reports prepared by the Contractor.

H. Acceptance Criteria

1. The Acceptance Criteria shall be as follows unless specifically indicated within applicable individual specification sections or test procedures.

    a. Accuracy/repeatability on sensing devices will be as specified for the device. CxA and TAB will use calibrated gauges for independent validation of sensing devices.
    b. HVAC sequence-related criteria will be as specified in the documents.

I. Deficiencies

1. CxA shall record the results of each functional test. All deficiencies or non-conformance issues shall be brought to Contractor’s attention

immediately, noted in the Issues Log, and reported to the Owner's Project Manager within 72 hours.

a. Corrections of identified minor deficiencies may be made during the tests where feasible. In such cases, the deficiency will be noted on the FPT documents.
b. Deficiencies with potential schedule or cost impacts shall be reported to the Owner's Project Manager within 24 hours of discovery.

2. Contractor shall correct all identified deficiencies as directed by the Owner's Project Manager and witnessed by the CxA.

a. CxA shall maintain Contractor's response to each deficiency in the Issues Log.
b. Contractor shall correct each deficiency, and notify CxA upon completion by completing an action item response.
c. Contractor shall schedule repeat testing and ensure CxA is available to observe.

3. Disputes:

a. Developer/Contractor shall notify the Owner's Project Manager and CxA immediately if the responsibility or nature of any identified deficiency is in dispute.
b. The CxA shall document as a disputed deficiency in the Issues Log.
c. The Contractor shall negotiate a resolution to the dispute with the DEN Project Manager.
d. Upon resolution , CxA shall update the Issues Log to reflect the status of the deficiency

J. Sampling Percentage:

1. Sampling percentage shall be as indicated in the test plan.
2. Where no sampling percentage is indicated, the implied sampling percentage is 100% and all units shall be tested.

K. Maximum Failure Limit:

1. Maximum Failure Limit shall be as indicated in the test plan.
2. When the maximum number of failures is reached, testing on that sample will be terminated and re-testing will be scheduled.
3. If no Maximum Failure Limit is indicated, the implied failure limit is 0% and all tested samples must pass.
4. Where sample tests involve multiple systems (i.e., checking strainers on different hydronic systems), the Maximum Failure Limit will apply per system.

L. Manufacturer's Defects:

1. If 10% of identical pieces of equipment fail to perform to the Contract

Documents (mechanically or substantively) due to a manufacturing defect, all identical units may be considered unacceptable by the Owner's Project Manager.

2. For the purposes of defining 'identical equipment' for this Section, size or capacity alone does not constitute a difference.
3. In case of failure due to manufacturer's defects, the Contractor shall provide the Owner with the following:

    a. Manufacturer**'**s response in writing as to the cause of the failure and proposed resolution.
    b. Manufacturer shall implement their proposed resolution on a representative sample of the product.
    c. The Owner's Project Manager will determine whether a replacement of all identical units or a repair is acceptable.
    d. Upon acceptance, the Contractor shall replace or repair all identical items at their expense and shall extend the warranty accordingly (if the original equipment warranty had begun).
    e. Manufacturer shall pay the costs of all retesting necessitated by the failure.

## 1.16 INTEGRATED SYSTEM TEST (IST)

A. Objectives and Scope

1. Upon completion of all the Construction Phases and prior to Project Final Acceptance, the Owner's Project Manager and CxA will witness and validate that each system that required phased integration with the existing/new systems construction, is operating according to the documented design intent and Contract Documents.
2. Developer/Contractor's will assist DEN Maintenance and CxA with access and operation of system controllers as needed.

3. CxA to witness a minimum of 10% sampling percentage, unless (at the discretion of the Owner's Project Manager), the related systems controllers are "normal" and functioning as required, then no additional testing will be performed.
4. Operate each system through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, normal and emergency power, fire alarm, part- and full-load) where there is a specified system response.
5. Verify responses to abnormal operational modes and conditions, such as power failure, freeze conditions, no flow, equipment failure, etc...

## 1.17 CLOSEOUT

A. Commissioning Report

1. A final summary report by the CxA shall be provided to the Owner's Project Manager and Developer, focusing on evaluating commissioning

process issues and identifying areas where the process could be improved.

2. Include all acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., compiled in appendices, and provided with the summary report.
3. Pre-Start Up verification, Start Up checklists, TAB, functional tests, and monitoring reports shall not be included the final report, but shall be submitted as part of the Commissioning Record in the O&M manuals.

B. Logs

1. CxA shall submit an updated Issues Log and all Issues Logs upon substantial completion of the project.

C. Acceptance

1. CxA shall recommend acceptance of each test in writing to the DEN Project Manager.
2. The CxA shall note each satisfactorily demonstrated function on the test documentation.
3. Tests shall be considered accepted only upon formal acceptance by the Owner's Project Manager.

D. Training

1. The Developer/Contractor shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.
2. The CxA shall review the content and adequacy of the training of DEN personnel for commissioned equipment. Any issues shall be noted in the Issues Log and reported immediately to the Owner's Project Manager.

E. Operation and Maintenance Manual and Record Drawing Review

1. Prior to Functional Area Readiness acceptance, the CxA shall review the O&M manuals, documentation, and redlined as-built drawings for systems that were commissioned to verify compliance with the Specifications.
2. The CxA shall review completed record drawings and document any discrepancies in the Issues Log.

END OF SECTION **019113**

## SECTION 019990 - STANDARD FORMS

Per the DEN Technical Specification Committee, this section is deleted from the DEN Technical Specification Library.

Please refer to the individual Sections for form information.

**END OF SECTION 019990**