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## 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. Change Notice:
  - 1. The Contractor will be required to submit a proposal for each Change Notice
  - 2. The Contractor shall submit a proposal for the complete scope of the Work within the specified duration identified by the Notice. Where there is no time requirement identified by the notice documents, the Contractor shall submit a proposal within 20 days of receiving the notice or as allowed in Title 11 - Changes in the Work, Contract Price, or Contract Time of the General Contract Conditions, 2011 Edition.
  - 3. The proposal could contain both competitive bid and estimated costs and shall adhere to the requirements of Title 11 of the General Contract Conditions.
  - 4. The Contractor shall not proceed on any change notice work until a change order is issued.
- D. Change Directives:
  - 1. The DEN Project Manager may issue Change Directive(s) for a Scope of Work. The Contractor shall keep all Time and Material record for any Change Directive(s) issued until a final settlement for the task is settled and finalized in a Change Order.
  - 2. The Contractor shall keep records and approvals for all Time and Material impacts of a Change Directive until a final settlement is reached and fully executed by the DEN Project Manager.
  - 3. The Contractor may invoice for a Change Directive in accordance with Title 11 of the General Contract Conditions, 2011 Edition.
- E. Guaranteed Maximum Price (GMP): For Contracts assigned as GMP the Contractor

shall follow the Special Conditions issued for the Contract.

- F. This Project will be administered using the current Project Management Information System (PMIS). The application will be supplied by DEN at no cost to the Contractor. DEN will provide PMIS training for up to two (2) of the contractor's personnel.
- G. The Contractor shall participate in a preconstruction coordination meeting and update the existing BIM Project Execution Plan or prepare a BIM Project Execution Plan if one does not exist based upon the DEN BIM Project Execution Plan (BXP) template included as provided by the DEN BIM group and the coordination meeting instructions.
- H. DEN utilizes several programs as part of the Asset Management System. Keeping accurate as-built record and operation and maintenance data are essential in the integrity and the validity of the airport operation. The Contractor is required to make every effort to keep the airport data informed, updated and accurate in the format required by DEN Project Manager:
  - 1. The Contractor shall provide and implement BIM Project Execution Plan based on the DEN BIM Project Execution Plan. The Contractor shall employ or contract a consultant to provide all the requirements to produce the Project model in the latest edition of the [currently approved DEN-BIM Standards Manual].
  - 2. The Contractor shall comply with all the requirements of DEN BIM Project Execution Plan and provide the data to DEN to produce the complete record of the BIM model of the Project
- I. 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 subcontract Qualified Material Testing Agency(s) to perform all necessary Quality Control, processing control and any additional Testing required by the Contract Documents.
  - 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 testing frequencies by DEN may escalate to higher percentages and the Contractor will be responsible for all costs associated with failing tests of the same pay item elements. The Contractor may not hire the DEN contracted or testing agency in any capacity on this Project.
- J. DEN Quality Assurance will perform all quality assurance pull and adhesion tests on all airfield joint sealants. Contractor shall perform all quality control tests for the same items.

- K. DEN Quality Assurance is required to submit a letter indicating that all Work performed on the project complies with all applicable codes. The Contractor shall make sure that all required test frequencies and all deficiencies has been corrected to comply with all applicable codes standards and the requirements of the Contract Documents.

### 1.3 WORK BY OTHERS AND FUTURE WORK

- A. Refer to Title 7 – Cooperation, Coordination and Rate of Progress of the General Contract Conditions, 2011 Edition

### 1.4 SITE CONDITIONS

- A. Refer to Title 14 – Site Conditions of the General Contract Conditions, 2011 Edition

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

## **PART 3 - EXECUTION**

### 3.1 CONTRACTOR'S DUTIES

- A. Refer to Title 3 – Contractor Performance and Services of the General Contract Conditions, 2011 Edition
- B. Execute the Work as specified and in a timely manner. Submit a schedule of Work that will be performed at times other than during the eight-hour working day of Monday through Friday, daylight hours. Submit this schedule five (5) working days prior to the beginning of Work to the DEN Project Manager for review and acceptance. Approval to work at night may be obtained after Contractor presents a written program outlining special precautions to be taken to control the extraordinary hazards presented by night work. That program shall include, but not limited to, supplementary lighting of work areas, availability of medical facilities, security precautions, and noise limitations.

### 3.2 COORDINATION

- A. Coordinate execution of the Work with those public utilities, governmental bodies, private utilities and other contractors performing work on and adjacent to the worksites. Eliminate or minimize delays in the Work and conflicts with those utilities, bodies, and contractors. Schedule governmental, private utility and public utility work that relies upon survey points, lines and grades established by the Contractor to occur immediately after those points, lines and grades have been established. Confirm coordination measures for each individual case with the DEN Project Manager in writing.
- B. In the coordination effort of work by others, the Contractor shall obtain and refer to equipment locations and other layouts, as available, to avoid interface problems.

- C. The City reserves the right to permit access to the site of the Work for the performance of work by other contractors and persons at such times that the City deems proper. The exercise of such reserved right shall in no way or to any extent relieve the Contractor from liability for loss and damage to the Work due to or resulting from its operations or from responsibility for complete execution of the Contract. The Contractor shall cooperate with other contractors and persons in all matters requiring common effort.

### 3.3 CONTRACTOR USE OF WORK SITE

- A. Confine work site operations to areas permitted by law, ordinances, permits, and the Contract.
- B. Consider the safety of the Work and that of the people and property on and adjacent to the work site when determining amount, location, movement, and use of materials and equipment on work site.
- C. Do not load work site with equipment and products that would interfere with the Work. Only equipment, tools, or materials required for this Work may be stored at the work site.
- D. Protect products, equipment, and materials stored on work site.
- E. Relocate stored products, equipment, and materials that interfere with operations of City, government bodies, public, and private utilities, and 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 **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 contracts with which the Contractor must interface are described elsewhere in the Contract Documents. Refer to Section 013210 "Schedule" and the Special Conditions for specific work constraints and milestones.

#### 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. The schedule shall comply with requirements indicated in the Special Conditions and Section 011400 "Work Sequence and Constraints". The Construction Schedule is described in Section 013210 "Schedule".

#### 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 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 Construction Documents.
  - 4. Contractor employee parking will not be allowed within the existing revenue control system. Parking facilities will be as indicated in the Construction Documents.
  - 5. Material for work in the Terminal may be brought in through the [Terminal Loading Dock accessed via Gate 1]. Employee and material access to the Concourses will be via [Gate 5].
  - 6. The Contractor shall use the haul routes specified in the Construction Documents.
  - 7. 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. Full airport and aircraft operations are underway adjacent to this Project. Contractors are required to obtain a Contractor Participant Manual from the Security Manager and must follow the guidelines in the manual. Copies of the Contractor section of the manual are available for review at the Denver International Airport Access Services Office.
  - 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. Conduct of persons using the Denver Municipal Airport system:

1. Contractor activities shall comply with Airport Operations and Regulation 130 "TRAFFIC" and Regulation 20 "CONDUCT OF PERSONS USING THE DENVER MUNICIPAL AIRPORT SYSTEM" shall be followed at all times. These regulations are available from Airport Operations at Denver International Airport.

E. 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.

F. Welding Equipment, Procedures and Constraints:

1. Natural gas-powered portable welders or inverter single- and three-phase electric portable welders are the only acceptable welding equipment to be used inside the building basement or tunnel areas. Acceptability of equipment other than the equipment noted above shall be at the sole discretion of the DEN Project Manager.
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. One person in each welding area solely designated as fire watch for each welder.
  - 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).





J. 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.

K. 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. The Contractor will designate a contact person for coordination with the DEN Project Manager and airline tenants. The contact person shall have the authority to make decisions for the Contractor firm and shall have binding signatory power for changes in work. The contact person shall be on site at all times during work activity.
- B. No additional costs shall be considered for coordination activities throughout this project. The Contractor shall include in the Contractor's bid costs for coordination of all activities.

**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. No other fossil fuel equipment may be used within the buildings unless the equipment is directly vented to the building exterior.
- B. Electric: Electric powered equipment is acceptable in the Work area.

## **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](http://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 011810 - UTILITIES INTERFACE

### 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. Various utilities are located within the limits of work in the Project area. The owners of these utilities hereinafter noted may require that the Contractor is to work around their existing facilities until such alterations, relocation, or abandonment have been completed. All known existing utilities are shown; however, the Contractor shall verify and satisfy himself that there are no other existing utilities that may not be shown.
- B. The owners of known utilities within the project area and corresponding representatives include, but are not limited to:
  - 1. Century Link Telephone
  - 2. DEN Telephone
  - 3. Xcel Energy Natural Gas
  - 4. Xcel Energy Elec. Services
  - 5. DEN Storm Water
  - 6. DEN Sanitary Sewer
  - 7. Denver Water Department
  - 8. Inland Technologies
  - 9. Fuel System (ASI)
  - 10. Premise Wiring System- DEN IT Section
  - 11. FAA Duct Bank
  - 12. Oil/Gas Wells
  - 13. DEN Electrical Department
  - 14. Fire Alarm System
  - 15. Paging System
- C. The location and establishment of each construction vehicle crossing shall be at sites mutually agreed upon in writing by the Contractor and the owner of the utility.
- D. At the locations where the Contractor needs to establish a construction vehicle crossing over any of the operating pipelines, the furnishing and placing of a crossing shall be by the Contractor. The crossing shall allow the normal operation of the pipeline at all times. Each crossing shall be adequately marked and signed for safe passage of vehicles over the crossing. Construction vehicles shall not be allowed to cross over operating pipelines at any place other than an established crossing.
- E. These utility locations are based upon information provided by the utility companies or

previous construction contractors that were the basis for determining utility coordinates. The Contractor is responsible for confirming the accuracy of the provided coordinates.

- F. The Contractor shall control the Contractor's operations in order to avoid creating any obstacles for the utility owner's access for maintaining or operating their equipment.

### 1.3 REFERENCE DOCUMENTS

- A. Section 312323.33 "Flowable Backfill (Controlled Low-Strength Material)"

### 1.4 REGULATORY REQUIREMENTS

- A. The Contractor shall obtain and pay for all utility company permits, fees, and licenses necessary for the execution of this work. The Contractor shall give all notices and shall comply with all laws, ordinances, rules, and regulations of all authorities having jurisdiction.

### 1.5 QUALITY CONTROL

- A. When the Contractor performs any operations that will affect a utility owner, 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.

### 1.6 WORK INCLUDED

- A. The Work of this Section includes furnishing all materials, equipment, and labor necessary to provide utility crossings as required and as specified herein and subject to approval by the associated utility owner.
- B. North American Resources has a line passing through airport property. The Contractor shall contact the utility prior to beginning earthwork operations to ascertain any special requirements or conditions required to maintain and protect this service during construction activities.
- C. FAA Underground Duct lines: The FAA has duct lines passing under the site. The Contractor shall contact the FAA prior to beginning earthwork operations to ascertain any special requirements or conditions required to maintain this service during construction activities.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Suitable cover material shall be in accordance with Colorado Department of Transportation Standard Specifications. Wet, soft, or frozen material, asphalt chunks, or other deleterious substances shall not be used for cover.
- B. Aggregate for road base material shall consist of clean, sound and durable particles of crushed stone, crushed gravel or crushed slag, shall be free from coatings of clay, silt and organic matter, and shall contain no clay balls. Material shall conform to the State of Colorado Standard Specifications for Road and Bridge Construction Class 6 aggregate base unless otherwise specified.
- C. The materials for the load distribution system on top of the cover shall conform to the specification of the American Institute of Steel Construction, the American Institute of Timber Construction, or the American Concrete Institute, as applicable, depending upon the system agreed upon between the Contractor and utility owner.
- D. Materials for the sleeving of the pipelines shall be purchased by the utility owner at the Contractor's expense.
- E. Comply with utility backfill requirements for the use of flowable backfill in Section 312323.33 "Flowable Backfill (Controlled Low-Strength Material)" and Division 26 and Division 33 requirements.

## **PART 3 - EXECUTION**

### **3.1 NOTIFICATION OF UTILITIES FOR LOCATING AND POTHOLING**

- A. The Contractor shall verify the location of all utilities prior to any operations including physically uncovering the utility to verify location as required by the utility owner.
- B. The Contractor shall notify the Utility Notification Center of Colorado at (303) 534-6700 or 811, as a minimum for location of utilities.

## **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 **011810**

## **SECTION 012510 - SUBSTITUTIONS**

### **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. All material and equipment substitutions must comply with Title 4, Article 406: Substitution of Materials and Equipment in the General Contract Conditions, 2011 Edition.
- B. 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 Contract Documents.
- C. If the substitution changes the Scope of Work, Contract cost, or Contract time, a Change Order is required.
- D. As-built drawings and specifications must include all substitutions even if a Change Order is not issued.

#### 1.3 REFERENCE DOCUMENTS

- A. Form CM-09, Request for Substitution
- B. Section 013300 "Submittal Procedures"
- C. Section 013325 "Shop and Working Drawings, Product Data and Samples"

#### 1.4 QUALITY CONTROL

- 1. The substitution shall provide as a minimum, the same performance as specified.

#### 1.5 SUBMITTALS

- A. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- B. A completed Form CM-09 shall be submitted at least 60 days prior to when an order needs to be placed or a method needs to be changed.



- C. The submittal shall contain all the data required to be submitted for acceptance of the originally specified item or process, including, as appropriate:
1. Detailed product data sheets for the specified items and the substitution.
  2. Samples and shop drawings of the substitution.

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

## **PART 3 - EXECUTION**

### **3.1 SUBSTITUTION PROCESS**

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

### **3.2 SUBSTITUTION REQUEST**

- A. The formal Request for Substitution will be evaluated by the DEN Project Manager and the Designer of Record based on the following criteria:
1. Compatibility with the rest of the project.
  2. Reliability, ease of use and maintenance.
  3. Both initial and long term cost.
  4. Schedule impact.
  5. The willingness of the Contractor to share equally in any cost savings.
  6. The ability of the item or process to meet all applicable governing regulations, rules, and laws along with funding agency requirements.
  7. The cost of evaluating the substitution.
- B. Based upon the above evaluation, the Sr. Director of AIM Development 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.

### **3.3 CONDITIONS**

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

- C. The statement shall be signed and dated by the Contractor's Superintendent.
- D. Replacement of Substitution Found to be Not Equal:. The Contractor shall be responsible for all aspects and conditions of the substitution that are not clearly identified in the substitution submittal, and shall be liable for the appearance, function, performance or other aspects of the substitution that are found not to be equal to the originally specified item.
  - 1. The Contractor shall incur all labor and costs associated with replacement of any substitution that is found to be not equal to the originally specified item or process and rejected by the DEN Project Manager.
  - 2. The replacement of any rejected substitution shall either be with the originally specified item or process, or a substitution approved by 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 **012510**

## SECTION 012910 - SCHEDULE OF VALUES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 RELATED REQUIREMENTS

- A. The Work specified in this Section consists of preparing and submitting the Schedule of Values ("Schedule") as referenced in the General Conditions. Use the Project Specifications Table of Contents or Bid Tabs, if applicable, as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. The Work also includes the preparing and submitting of updated copies of the Schedule if the Schedule is affected by change orders.
- B. A Schedule of Stored Material is a detailed cost breakdown for permanent materials that will be temporarily stored prior to their being installed and for which the Contractor seeks partial payments. The Schedule of Stored Material will be incorporated as a part of the Schedule of Values.
- C. Within 14 calendar days of issuance of the Notice to Proceed (NTP), the Contractor shall submit the Schedule of Values including the Schedule of Stored Material if applicable. The Schedule of Values and Schedule of Stored Material used to prepare the work/cost breakdown for the Schedule will be used for the Contractor's billings.
- D. Any Contract allowances shall be included in the Schedule. Expenditure of allowances shall be done using the Allowance Authorization form. Use of this form does not increase or decrease the Contract value.

#### 1.3 RELATED DOCUMENTS

- A. Title 9 – Compensation of the General Contract Conditions, 2011 Edition
- B. Section 013300 "Submittal Procedures"
- C. Section 013325 "Shop and Working Drawings, Product Data and Samples".
- D. Form CM-89, Schedule of Values
- E. Form CM-91, Schedule of Values for Unit Price Contracts

#### 1.4 SUBMITTALS

- A. The Schedule of Values shall be formally approved by the DEN Project Manager.
- B. The Schedule shall identify each item of work. Work items in the Schedule shall represent all Work and shall be referenced with the Technical Specifications section numbers, specification subparagraph, specification section title and the bid item number used for the Schedule of Prices and Quantities when applicable.
- C. Upon request by the City, the Contractor shall support values given with the data that will substantiate the correctness of the values.
- D. The Schedule will be utilized only as a basis for review of the Contractor's application for progress payment.

#### 1.5 REVIEW AND RESUBMITTAL

- A. If review by the DEN Project Manager indicates that changes to the Schedule are required, the Contractor shall revise and resubmit the Schedule.

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

### **PART 3 - EXECUTION**

#### 3.1 PREPARING SCHEDULE OF VALUES

- A. Provide a breakdown of the Contract Price in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
- B. Breakdown of the items used in the Schedule shall include the following item costs. Ensure each item is complete:
  - 1. Delivered cost of product with applicable taxes paid.
  - 2. Total installation cost with overhead and profit.
  - 3. Breakdown costs of each lump sum item with a list of products and major operations for which the Contractor seeks to receive progress payments to recover the Contractor's costs for that bid Item.
  - 4. Each unit price item as listed in the bid Schedule of Prices and Quantities shall list products and major operations for which the Contractor seeks to receive progress payments for that bid item.

#### 3.2 PREPARING SCHEDULE OF STORED MATERIAL

- A. The Contractor shall submit with the Schedule an indication of whether products will be stored on or off the work site. The Schedule of Stored Material shall show all quantities and types of products that will be stored.

- B. Material allowances consist of only the net cost of the product, the cost of delivery and unloading at the storage site, the cost of applicable sales taxes, and all discounts.
- C. In no case will the cost paid for a permanent material be greater than 90 percent of the Contract price for the Work in which they are included.

### 3.3 PAYMENT FOR STORED MATERIALS

- A. Only materials that are described in the specifications and on the drawings will be considered permanent materials. Permanent materials are materials that will be left in the Work after the Contract is completed.
- B. Nothing in these specifications shall be interpreted as requiring the City to pay for stored materials. The DEN Project Manager shall decide on a case-by-case basis whether stored materials shall be paid for. No payment will be made for stored materials that have not been submitted and accepted.
- C. The Contractor must, at all times, store permanent materials in accordance with manufacturer's recommendations. Any material not properly stored will not be paid for. Amounts will be deducted from payments for any stored permanent material previously paid for and subsequently found to be improperly stored or not present, based upon a physical inventory of stored permanent material.
- D. Only the neat line quantity of material needed for the finished product may be paid for.
- E. All requests for stored permanent material payment must be accompanied by paid invoices clearly showing the quantity of permanent material, the type of permanent material and discounts or rebates and the net amount paid to the supplier along with a certificate stating that the permanent material is free of any liens or judgments preventing its use by the City.
- F. If the permanent material is stored outside the Denver area the Contractor must pay for the City representative's transportation and lodging to see the stored material as needed. Acceptable lodgings must, as a minimum, have a Mobil Travel Guide Rating Criteria® rating of Two-Star or the American Automobile Association Lodging Listing Requirements & Diamond Rating Guidelines® rating of Two Diamonds. The minimum transportation shall be by regularly scheduled commercial air carrier at coach rates. The DEN Project Manager will determine if an overnight stay is required.
- G. All permanent material stored off site, for which payment is being requested, must be insured and stored in bonded, insured warehouses. The Contractor shall provide proof of insurance for all material stored off site, and specific address and storage conditions of storage location.
- H. Any permanent material on which payment is requested must be in such a form that it cannot be used on work other than this Contract, or stored in a manner acceptable to the DEN Project Manager to ensure that the permanent material cannot be used on work other than this Contract.

3.4 ALLOWANCE AUTHORIZATION AND PAYMENT

- A. Contractor shall request written approval for expenditure of any Contract allowances PRIOR TO performing the Work involved. List work to be performed and estimated cost in the requesting correspondence.
- B. Original copies of all invoices and receipts must be submitted with the Allowance Authorization as part of the request for payment.
- C. Using the format provided by the City, the Contractor's request for payment of all Contract allowances shall be included in the Schedule of Values.

**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 **012910**

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### 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 provisions for coordinating construction operations and coordination with other stakeholders and adjacent Contractors on the Project including,

1. Subcontractor's Acceptance Certification and Subcontractors List.
2. General Coordination Procedures.
3. Contract Administration Procedures.
4. Current Project Management Information Systems (PMIS)
5. Coordination drawings.
6. Current DEN Asset Management Systems
7. Requests for Information (RFIs).

- B. Related Requirements:

1. Section 011100, " Summary of Work" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
2. Section 011400 "Work Sequence and Constraints" for shutdown requests and coordinating with airport operational activities.
3. Section 011420 "Security Requirements and Sensitive Security Information (SSI)".
4. Section 013210 "Schedule" for preparing and submitting Contractor's Construction Schedule.
5. Section 013223 "Construction Layout, As-built and Quantity Surveys" for coordinating, survey activities and survey related record documents.
6. Section 013300 "Submittal Procedures. "
7. Section 013325 "Shop and Working Drawings, Product Data and Samples".
8. Section 017720 "Contract Closeout" for coordinating closeout of the Contract.
9. Section 017419 "Construction Waste Management and Recycling".
10. DEN Building Information Modeling (BIM) Design Standards Manual (DSM)

#### 1.3 DEFINITIONS

- A. RFI: Request from the DEN Contractor DEN Project Manager seeking information required by or clarifications of the Contract Documents.

1.4 SUBMITTALS - SUBCONTRACTORS ACCEPTANCE CERTIFICATION AND SUBCONTRACTORS LIST

- A. To comply with Section 502.2 in the General Contract Conditions, 2011 Edition, the Contractor must complete and submit form CM-02 Subcontractor Acceptance Certification for each Subcontractor working on the project. Additionally, the Contractor must prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.
- B. Provide emergency contacts list to the DEN Project Manager prior to any site activities. List must contain project name, number, location, company name and address, name and title of emergency contacts in order and time and assigned responsibilities. Keep list current and accurate at all times. Include any specific security arrangements or special projects requirements.
- C. Within two (2) days of Notice to Proceed, the Contractor shall submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identifying individuals and their duties and responsibilities listing addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Providing names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of the accepted list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination with other Contractors:
  - 1. For details on coordinating with other Contractors, refer to Article 701 Cooperation with Other Work Forces, Article 702 Coordination of the Work, and Article 703 Coordination of Public Contact in the General Contract Conditions, 2011 Edition.
- B. Minimum cooperation requirements with other contractors include the following, unless directed by the DEN Project Manager in writing:
  - 1. Regular meetings, minimum weekly.
  - 2. Construction schedule coordination.
  - 3. Staging area and access planning (to include employee shuttle routes).
  - 4. Deliveries.
  - 5. Traffic control.
  - 6. When and where required or specified, the Contractor shall develop appropriate coordination drawings for use by interfacing adjacent parties using the Denver International Airport site.
- C. The following is a list that includes, but is not limited to, all of the contractors that will be working in the area of the project limits:



- D. Coordination with DEN entities shall include but is not limited to the following:
1. Coordinate with Owner Contracted Communication Contractor.
  2. Coordinate with Utility Companies for utilities that are single sole source.
  3. Coordinate with Airport Security and DEN Maintenance for all security related services.
  4. Coordinate with DEN Life Safety Team for all issues related to fire alarm, fire protection systems in addition to compliance with all regulatory agencies.
  5. Coordinate all shutdowns and system interruptions in accordance with section 011400 "Work Sequence and Constraints."

1.6 Contract Administration Procedures:

- A. This Project will be administered in part using the current Project Management Information System (PMIS). Any processes necessary to properly administer the Contract and not included in the list below shall be addressed as acceptable to the DEN Project Manager. DEN Project Manager may modify the list below in serialized correspondence without constituting a change to the Contract. Administrative tools and processes shall not in any form waive any contractual or legal requirements of the law or the Contract. The Contractor shall attend all coordination meetings with the DEN Project Manager and the DEN Project Control Administrators to arrange for staff training, and technical support to facilitate the execution of electronic data management and control.
- B. Project Management Information Systems (PMIS): Oracle Unifier Enterprise Project Portfolio Manager (EPPM), or the Oracle Primavera P6.
- C. All submittals, RFIs, Pay Applications, Correspondence, change requests, and pricing proposals and settlement agreements shall be recorded and submitted using the current PMIS:
1. The Contractor shall follow the specified PMIS Access Request Procedure and adhere to all user license conditions.
  2. The Contractor shall sign the Information Technology Agreement (ITA) to comply with the DEN computer system security requirements and any contractual obligation to the software and service providers for the current PMIS software
  3. DEN will train the Contractor's staff on the use of the PMIS.
  4. At a minimum, the Contractor shall provide computer hardware and software to meet the following requirements and to run the following programs, as required for the project:
    - a. Internet connectivity that provides the necessary high-speed connection to perform all activities indicated in this Contract.
    - b. Internet Explorer version 8 or higher.
    - c. Based on the project, a specific Java JRE application may be required, which can be downloaded from the Internet. If needed, the revision and update number will be provided at NTP.
    - d. Other files capability pre-approved by the DEN Project Manager or as required by the DEN BIM Execution Plan

- e. Most current version of Revit, as per DEN requirements.

## 1.7 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, BIM Design Standards Manual and BIM Project Execution Plan (BPXP), and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity. Coordination drawings will be the result of a Contractor driven Spatial Coordination effort as spelled out in the BPXP.
  1. Field verify all existing dimensions and any as-built dimensions, whether built by the Contractor or others, necessary to produce accurate coordination and working drawings.
  2. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Models/Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on the Models/Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to DEN Project Manager indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Using software as in the BPXP, the Contractor shall coordinate these systems per floor or zone per BPXP, and as follows:
  1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems,

- mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor control center locations.
    - d. Location of pull boxes and junction boxes dimensioned from column centerlines.
  8. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  9. Review: DEN Project Manager will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If DEN Project Manager determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, DEN Project Manager will so inform Contractor, who shall make changes as directed and resubmit.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings, unless approved otherwise by DEN Project Manager.
  2. File Preparation Format: Provided in the Project BIM Execution Plan operating in Microsoft Windows operating system.

3. File Submittal Format: Submit or post coordination drawing files as required in the Project BIM Execution Plan.
  4. The submittal must be logged in accordance with the submittal procedure
  5. For Fire Protection system; provide shop drawing and design calculations as approved by the building department. Submit as-built drawings in format as outline in BXP.
  6. For all projects, receiving official variance from the BIM requirements not utilizing BIM, coordination drawings must be submitted in acceptable digital format shall be in an industry recognized 3D AutoCAD model.
  7. BIM File Incorporation: DEN Project Manager will incorporate Contractor's coordination drawing files into Building Information Model for Revit as established for Project.
    - a. Contractor shall lead three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect or other sub-consultants.
  8. DEN Project Manager will furnish Contractor one (1) set of digital data files of Models and/or Drawings for use in preparing coordination digital data files.
    - a. The Design consultants and Contractors and Sub Contractors acknowledge and represent the following Right Of Reliance regarding Electronic Models and/or Drawing deliverables:
      - 1) Models may be transferred for allowing the recipients to develop derivative models to develop the means and methods by which to construct the project.
      - 2) It must be clear that each party be able to rely on the fact that the model furnished by others "match the 2D Contract Documents or shop drawings in their equivalent state of development"
- 1.8 Coordination with DEN Asset Management System:
- A. The full intent is to produce comprehensive record documents integrating existing data in the form of digital files and models, reconciled to actual field conditions, modifications or additions facilities or components of existing facilities according to new Contract Documents, and to produce record documents that could be incorporated into DEN asset management system.
  - B. Utilize the BIM to link all necessary data content to the model and follow the BXP as collaboratively modified by the Contractor, Designer, and DEN BIM Administrators and approved by DEN Project Manager
  - C. Provide the following information through the execution of the Contract for all elements and element types that DEN has designated as assets. The information shall include but is not limited to:
    1. Project title, number, project manager contact information, contractor and

- subcontractor contact information
- 2. Pertaining shop drawings
- 3. Operational Manuals and safety information, MSDS and cut sheets, and any pertinent technical information.
- 4. Details of all components' maintenance procedures and requirements.
- 5. Details of all applicable warranties including but not limited to; warranty providers, manufacturers information, warranty start and finish dates, contacts , bonding company name, consent of surety,
- 6. Equipment location (by room number and location description or grid location format acceptable to DEN Project Manager, for civil projects), equipment make, model, serial number, and other asset information as outlined in the DEN BIM DSM
- 7. List of all spare parts including but not limited to; equipment make and model, location, submittal number or link, and suppliers reordering information
- 8. Commissioning results, acceptance criteria, test reports, and Tab reports

#### 1.9 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI through the PMIS
  - 1. DEN Project Manager will distribute the RFIs to the proper entities.
  - 2. DEN Project Manager will coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's Work or work of subcontractors
- B. DEN Project Manager has the right to reject-RFIs or those that do not contain proper information and required data to properly evaluate the request and respond in a timely manner.
- C. RFIs: Use PMIS to generate RFIs.
  - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
  - 2. Attachments include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- D. For projects not using Unifier to create the RFI, the RFI must include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of DOR and DEN Project Manager.
  - 6. RFI number, numbered sequentially.

7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- E. DEN Project Manager will review each RFI, determine action required, and respond. RFIs received by DEN Project Manager after 1:00 p.m. will be considered as received the following working day. Direct responses by any entity other than DEN Project Manager shall not be binding to the City and County of Denver. E-mails, and verbal conversations must be followed by an official RFI or proper contractual vehicle before it is considered for any additional compensation or time impact to the project terms and conditions.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of DEN Project Manager's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. DEN Project Manager's action may include a request for additional information, in which case DEN Project Manager's time for response will date from time of receipt of additional information.
  3. DEN Project Manager's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Title 11 - Changes In the Work, Contract Price, or Contract Time in the General Contract Conditions, 2011 Edition as amended by Special Conditions.
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify DEN Project Manager in writing within five (5) days of receipt of the RFI response or the time required by Title 11 - Changes In the Work, Contract Price, or Contract Time in the General Contract Conditions, 2011 Edition
- F. RFI Log: For projects not utilizing the PMIS application, prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. The log shall include but not limited to the following data:
1. Project name.

2. Name and address of Contractor.
3. Name and address of DEN Project Manager.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date DEN Project Manager's response was received.

**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 additional Payment will be made for compliance with the requirements of this section.

END OF SECTION **013100**

## **SECTION 013119 - PROJECT MEETINGS**

### **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 requires the Contractor's Project Manager, Superintendent, and Quality Control representative to attend meetings scheduled by the DEN Project Manager for the collection and dissemination of information related to the subject Contract.
- B. The DEN Project Manager will prepare the minutes of each meeting and distribute them to each of the participants.

#### 1.3 REFERENCE DOCUMENTS

- A. Form CM-01, Preconstruction Meeting Agenda
- B. Form CM-62, Construction Meeting Agenda/Minutes

#### 1.4 OTHER MEETINGS

- A. The Contractor shall attend all other project related meetings as directed by the DEN Project Manager.

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

### **PART 3 - EXECUTION**

#### 3.1 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be scheduled by the DEN Project Manager after the Contract has been signed by all parties. The purpose of this meeting is to introduce the City's Representatives to their counterparts in the Contractor's organization and to establish lines of communication between these representatives and outline some Contract requirements. The Contractor's key personnel shall attend this meeting.



- B. The DEN Project Manager will distribute a notice of this meeting, along with an agenda of the subjects to be addressed. Refer to form CM-01, Preconstruction Meeting Agenda.
- C. The DEN Project Manager will explain and discuss the responsibilities and authorities of the City, the Designer of Record, and the DEN Project Manager's organization.
- D. The Contractor shall introduce the Contractor's key personnel, subcontractors, and representatives and briefly describe each person's responsibilities.
- E. Explanations provided by the DEN Project Manager will not amend, supersede, or alter the terms or meaning of any Contract document, and the Contractor shall not claim reliance on such explanations as a defense to any breach or failure by the Contractor to perform as specified in the Contract.

### 3.2 CONSTRUCTION PROGRESS MEETINGS

- A. Progress meetings will be scheduled weekly and more often as necessary by the DEN Project Manager to promote the competent and timely execution of the Contract.
- B. The meetings will be held at the work site or at a location selected by the DEN Project Manager. Meetings will be chaired by the DEN Project Manager or the DEN Project Manager's representative.
- C. The Contractor's key personnel shall attend unless otherwise agreed by the DEN Project Manager.
- D. At a minimum, and as directed by the DEN Project Manager, the items detailed in CM-62, Construction Meeting Agenda/Minutes shall be addressed at each meeting. The items addressed in the meeting do not waive notification or submittal requirements as required elsewhere in the Contract.
- E. The DEN Project Manager will be responsible for publishing minutes of the meetings. Refer to form CM-62, Construction Agenda/Meeting Minutes.

## 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 shall be made for work under this Section.

- B. All payments for any Work done under this contract shall be in accordance with Title 9  
- Compensation of the General Contract Conditions, 2011 Edition.

END OF SECTION **013119**

## SECTION 013210 - SCHEDULE

### 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. Preliminary Construction Schedule.
2. Initial Project Construction Schedule (IPS).
3. Monthly Progress Schedule update.
4. As-built Schedule.
5. Three-Week Look-Ahead Schedule.
6. Submittal Schedule.
7. Fabrication Schedule.
8. Material Delivery Schedules, cranes, special equipment and staging status.
9. Daily Superintendent/Foreman Reports
10. Daily Quality Control Reports
11. Special reports:
  - a. Weather impacts and mitigations.
  - b. Recovery Schedule and alternatives.

- B. Reference Documents

1. Article 1105 – Time Extensions in the General Contract Conditions, 2011 Edition.
2. Section 011100 "Summary of Work"
3. Section 011420 "Work Sequence and Constraints".
4. Section 012910 "Schedule of Values".
5. Section 013119 "Project Meetings"
6. 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 Construction Schedule consume time and resources:
- B. Contract Time: Total number of days provided in the Contract Documents from the Notice to Proceed to the date of Final Completion of the Work. Substantial Completion

shall occur prior to Final Completion. Contract Time may be further defined and divided into phases by the Technical Specifications or Special Conditions. The Contract Documents may require completion on or before a certain specified date.

- C. **Cost Loading:** The allocation of the total contract value spread across each appropriate activity. All project costs, including those for stored materials, allowances and indirect costs shall be loaded into the schedule and shall be balanced to where no activity is unfunded.
- D. **Critical Activity:** An activity on the critical path that must start and finish on the planned early start and finish dates. Any delay in the start or finish of a critical activity will cause a delay to the project finish.
- E. **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.
- F. **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. Activities on the critical path have a total float of zero.
- G. **Data Date:** The date on which the schedule status is determined. For initial schedules, it is the project Notice to Proceed date. For schedule updates, it is the reporting period cut-off date. Updated schedules depict the actual status of the work started, on-going and/or completed within the reporting period. The data date is used to start the scheduling calculations for forward and backward passes.
- H. **Days:** Consecutive calendar days unless specifically designated otherwise and includes weekends, holidays or days of normal inclement weather.
- I. **Direct Man-hours:** Man-hours related only to the physical construction of the Work, i.e., drywall, carpeting, electrical, masonry, mechanical, etc.
- J. **Final Completion:** Occurs following Substantial Completion and when the Project Manager confirms in writing that the Contractor has completed the work in accordance with the contract, including completion of all punch list items, cleanup work and delivery of all required guarantees, warranties, licenses, releases and other required deliverables.
- K. **Free float:** The amount of time an activity can be delayed without adversely affecting the early start of its successor activity.
- L. **Indirect Man-hours:** Man-hours related to support of the physical construction of the Work, i.e., mobilization, cleanup, traffic control, temporary activities, badging, supervision and overhead, etc.
- M. **Lag:** The delay of a successor activity and represents time that must pass before the second activity can begin. There are no resources associated with a lag.

- N. Lead: The acceleration of a successor activity where it can begin in parallel with the predecessor activity. It compresses the total combined duration of both activities. The dependency must be discretionary and there is no physical limitation on completing Activity "A" before Activity "B" begins.
- O. Longest Path: The longest continuous path of activities through a project, which controls project early completion. It is possible for otherwise defined critical path activities to not be on the longest path and longest path activities to not show calculated critical float.
- P. Notice to Proceed: A notification letter from the Owner addressed to the contractor stating the date on which the contractor can begin project work. The NTP date marks the beginning of the Contract Time.
- Q. Predecessor Activity: An activity that comes before a dependent activity in the network sequence. It must either start or finish before a specified activity can begin.
- R. Resource Loading: A calculated value based on the actual worker's hours and costs, equipment and materials costs that are required to complete an activity. The value is allocated to the specific activities.
- S. Substantial Completion: The Work has progressed to the point that the City can beneficially occupy or utilize the Work for the purpose for which it is intended, and the Work complies with all applicable codes and regulations, including, if required, issuance of a certificate of occupancy, or certificate of suitability for use from the appropriate governmental agencies, as determined by the Manager in its sole discretion.
- T. Successor Activity: A dependent activity that logically comes after another activity in the network sequence.
- U. Total 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.
- V. Work Breakdown Structure (WBS): A hierarchical decomposition of the Work to be executed by the contractor. It shall allow for the roll-up and summarization to a predetermined level. The level of breakdown shall be agreed upon by the Contractor and the DEN Project Manager prior to the start of Work.
- 1.4 SUBMITTALS
- A. Submit for City acceptance the following in accordance with Section 01 33 00 – Submittal Procedures:
1. Project Scheduler Qualifications
  2. Preliminary Project Construction Schedule
  3. Initial Project Construction Schedule
  4. Monthly Progress Update Schedules

5. Time Impact Analysis, when necessary
6. As-built Schedule

B. Scheduler/Scheduling Consultant Qualifications:

1. A professional with a minimum of two (2) years of experience with scheduling construction projects similar in size and scope of work as this project using Oracle Primavera P6 software.
2. The scheduler shall have a comprehensive knowledge of Critical Path Method (CPM) scheduling principles and application.
3. The scheduler shall also have the ability to produce reports and diagrams within 24 hours of the DEN Project Manager's request and be able to perform the below tasks, including, but not limited to, the following:
  - a. Create, maintain and update the project construction schedule.
  - b. Prepare monthly progress schedule updates, submit for review and incorporate the City's review comments into the schedule, if any.
  - c. Coordinate the participation of qualified personnel to assist in the development of the initial construction schedule and updating of the monthly progress schedule.
  - d. Develop a WBS to the appropriate level and be able to discuss verbally and in writing the applicability of the WBS.
  - e. Incorporate delivery dates for Owner-furnished products.
  - f. Incorporate submittal requirements, procedures and time required for review of submittals and resubmittals.
  - g. Incorporate requirements for tests and inspections by independent testing and inspecting agencies.
  - h. Incorporate time required for Project closeout and Owner start-up procedures, including commissioning activities.

1.5 COORDINATION

- A. Pre-scheduling Conference: Schedule conference at Pre-Construction meeting to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to setting up the Preliminary Project Construction Schedule and Initial Project Construction Schedule, including, but not limited to, the following:
1. Verify availability of qualified personnel needed to develop and update schedule.
  2. Review content and format for reports.
  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. Coordinate Initial Project Construction Schedule with the Schedule of Values.
  
- C. Work items in the Initial Construction Schedule shall be identified in a Work Breakdown Structure (WBS) format that corresponds with the areas, phasing or schedules of the project and the technical specifications.
  
- D. Secure time commitments for performing critical elements of the Work from entities involved.
  
- E. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 SOFTWARE

- A. DEN Default Software:
  - 1. DEN shall use Oracle Primavera P6, Release 18.7 for all City scheduling needs.
  
- B. Contractor Software:
  - 1. Scheduling software used by the contractor shall be Oracle Primavera P6 Release 16 or higher.
  - 2. The software and any support agreements shall be purchased at the contractor's expense from a vendor of the contractor's choosing.
  - 3. The City will not provide training or support services for contractor purchased software.
  
- C. Oracle Primavera P6:
  - 1. The following settings are mandatory and required in all schedule submissions to the City:
    - a. Activity codes shall be Project Level, not Global or EPS level.
    - b. Calendars shall be Project Level, not Global or Resource level.
    - c. Activity Duration Types shall be set to "Fixed Duration & Units".
    - d. Percent Complete Types shall be set to "Physical".
    - e. Time Period Admin. Preferences shall remain the default "8.0 hour/day, 40 hour/week, 172 hour/month, 2000 hour/year". Set Calendar Work Hours/Day to 8.0-hour days.
    - f. Set Schedule Option for defining Critical Activities to "Total Float less than or equal to zero (0) hours/day".

- g. Set Schedule Option for defining progressed activities to “Retained Logic”.
- h. Set up cost loading using single lump sum resource. The Price/Unit shall be \$1/hour, Default Units/Time shall be 8h/d”, and settings “Auto Compute Actuals” and “Calculate Cost from Units” selected.
- i. Activity ID’s shall not exceed 10 characters.
- j. Activity Names shall have the most defining and detailed description within the first 30 characters.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Prepare for acceptance all Project Schedules utilizing the Critical Path Method (CPM) of network calculation to generate all Project Schedules.
- B. Prepare each Project Schedule utilizing the Precedence Diagram Method (PDM).
- C. Show in the schedule, the proposed sequence to perform the work and dates contemplated for starting and completing the schedule activities.
- D. The scheduling of the entire project is required.
- E. Provide a schedule that is forward planning as well as a project monitoring tool
- F. Contractor management personnel shall actively participate in its development.
- G. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate project schedule.
- H. The contractor shall keep the subcontractors and suppliers informed of the Project Construction Schedule to enable the subcontractors to plan and perform their work properly.

### 3.2 COST LOADING

- A. Activity cost loading shall be reasonable and without front-end loading.
- B. Provide additional documentation to demonstrate reasonableness, if requested by the City.

### 3.3 WITHHOLDINGS / PAYMENT REJECTION

- A. Failure to meet the requirements of this Section may result in the disapproval of the schedules or updates and subsequent rejection of payment requests until requirements are met.
- B. If the DEN Project Manager directs schedule revisions and those revisions have not



been included in subsequent Project Schedule revisions or updates, the DEN Project Manager may withhold 10 percent of pay request amount for each payment period until such revisions to the project schedule have been made.

### 3.4 PROJECT SCHEDULE DETAIL REQUIREMENTS

#### A. Level of Detail Required

1. Develop the Project Schedule as a Level 4 execution schedule.
2. Level of detail to address major milestones and to allow for satisfactory project planning and execution.
3. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval.
4. The DEN Project Manager will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail

#### B. Activity Durations

1. Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods.
2. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days.

#### C. Procurement Activities

1. Include activities associated with the critical submittals and their approvals, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies.
2. Long lead procurement activities are those with an anticipated procurement sequence of over 30 calendar days.

#### D. Mandatory Tasks

1. Include the following tasks/activities in the preliminary and initial project schedules and all updates.
  - a. Notice to Proceed milestone activity.
  - b. Submission, review and acceptance of preconstruction submittals (individual activity for each).
  - c. Long procurement activities.
  - d. Submission and approval of testing activities, as needed by project.
  - e. Submission and approval of Operations & Maintenance (O&M) manuals.
  - f. Submission and approval of as-built drawings.
  - g. City Punch list walk-through.
  - h. Correction of Punch list items based on City Punch list walk-through.
  - i. Substantial Completion milestone activity.

#### E. Owner Activities

1. Show the City and other agency activities that could impact progress. These

activities include, but are not limited to:

- a. Approvals
- b. Acceptance
- c. Building Department Permits
- d. Environmental Permit Approvals by State Regulators
- e. Inspections
- f. Utility Tie-Ins
- g. Owner Furnished Equipment
- h. NTP For Phasing Requirements.

F. Workers Per Day

1. Assign workers per day for the field construction and direct work activities, if directed by DEN Project Manager.
2. Workers per day shall be the average number of workers expected each day to perform the task for the duration of the activity.

G. Responsible Party Coding

1. Assign responsibility for activities to the Prime Contractor, subcontractors, DEN or other agencies responsible for performing the activity.
2. Activities cannot have more than one Responsibility Code.
3. Examples of acceptable activity code values are:
  - a. DOR (Designer of Record)
  - b. ELEC (electrical subcontractor)
  - c. MECH (mechanical subcontractor)
  - d. PAVE (paving subcontractor)
  - e. DEN (Denver International Airport)

H. Calendars

1. Schedule activities on a calendar to which the activity logically belongs.
2. Develop calendars to accommodate Contract-defined work periods, such as a 7-day calendar for City Acceptance activities, concrete cure times, etc.
3. Develop the default calendar to match the physical work plan with non-work periods identified including weekends and holidays.
4. Develop and assign seasonal calendars to seasonally affected activities.
5. If an activity is weather-sensitive, assign it to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar:
  - a. The assignment of the non-work days should be over a 7-day week since weather records are compiled on 7-day weeks, which will cause some of the weather related non-work days to fall on weekends.
  - b. Monthly average rain and snow measurements can be obtained from the National Climatic Data Center for the Denver Metropolitan Area or any similar trusted resource.

I. Contract Milestones and Constraints

1. Milestone shall be used for significant project events including, but not limited to, project phasing, project start and end activities, and interim milestone and/or completion dates.
2. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.
3. Mandatory constraints that ignore or affect network logic are prohibited.
4. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to DEN Project Manager for approval on a case-by-case basis.

J. Project Start Date Milestone

1. The first activity in the project schedule shall be a start milestone titled "NTP Issued" with a date equal to the date that NTP was issued to the contractor.

K. Project Finish Milestone

1. The last activity in the schedule shall be a finish milestone titled "Substantial Completion".
2. The project schedule shall be constrained to reflect the last day of the contract duration in such a way that if the schedule calculates an early finish, then the float calculation for "Substantial Completion" milestone reflects positive float.
3. If the project schedule calculates a late finish, then the "Substantial Completion" milestone float calculation reflects negative float.
4. The City is under no obligation to accelerate City activities to support a Contractor's early completion.

L. Interim Completion Dates and Constraints

1. Constrain contractually specified interim milestone completion dates to show negative float when the calculated last finish date of the last activity in that phase is later than the specified interim completion date.

M. Start Phase

1. Use a start milestone as the first activity for a project phase.
2. The start milestone shall be called "Start Phase X" where "X" refers to the phase of work.

N. End Phase

1. Use a finish milestone as the last activity for a project phase.
2. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

O. Open Ended Logic

1. Only two (2) open ended activities are allowed: the first activity "NTP Issued" shall have no predecessor logic, and the last activity "Substantial Completion" shall have no successor logic.

P. Default Progress Data Disallowed

1. Actual Start and Finish dates shall not automatically update with default mechanisms included in the scheduling software.
2. Updating of the percent complete and the remaining duration of an activity shall be independent functions.
3. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided in the Contractor Quality Control Reports.
4. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

Q. Out-of-Sequence Progress

1. Activities that have been progressed before the preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis and subject to DEN Project Manager approval.
2. Propose logic corrections to eliminate Out-of-Sequence Progress.
3. Address Out-of-Sequence Progress and logic changes in the Narrative Report and in the periodic schedule update meetings.

R. Added and Deleted Activities

1. Do not delete activities from the project schedule or add new activities to the schedule without approval from the DEN Project Manager.
2. Activity ID and description changes are considered new activities and shall not be changed without approval from the City.

S. Original Durations

1. Activity Original Durations (OD) shall be reasonable to perform the work item. OD changes are prohibited unless justification is provided to and approved by the DEN Project Manager.

T. Leads, Lags, and Start to Finish Relationships

1. Lags shall be reasonable as determined by the DEN Project Controls and not used in place of realistic original durations, shall not be in place to artificially absorb float, or to replace proper schedule logic.
2. Leads (negative lags) and Start to Finish (SF) relationships are prohibited.

U. Retained Logic

1. Schedule calculations shall retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity starts, and the predecessor activity has not finished (out-of-sequence progress).
2. Software features that, in effect, sever the tie between predecessor and successor activities when the successor has started, and the predecessor logic is not satisfied ("progress override") shall not be allowed.

V. Percent Complete

1. Update the percent complete for each activity started, based on the realistic assessment of earned value.
2. Activities which are complete, but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

W. Remaining Duration

1. Update the remaining duration for each activity based on the number of estimated work days necessary to complete the activity.
2. Remaining duration may not mathematically correlate with percentage found under Paragraph "Percent Complete", above.

X. Work Performed Under Adverse Weather Conditions

1. In accordance with the 2011 Denver General Contract Conditions (GCC) Section 305 Work Performed Under Adverse Weather Conditions, adverse weather conditions are those that are not abnormal weather conditions but that can, depending on the Work to be performed, cause defective Work.
2. High and low temperatures, excessive moisture or unusual drying conditions are examples. Reflect the number of anticipated adverse weather days allocated to a weather-sensitive activity in the activity's calendar.
3. These conditions must be recorded in the Contractor Daily QC Reports, notification of adverse weather shall be given within twenty-four (24) hours of occurrence to the DEN Project Manager for concurrence and the adverse weather day documented in order to be considered for a time extension adjustment.

Y. Time Extensions for Abnormal Weather Conditions

1. In accordance with the 2011 Denver General Conditions (GCC) Section 1105 Time Extensions, if abnormal weather conditions are the basis for a request to extend the Contract Time, such request will be documented by data substantiating that weather conditions were unusually severe for the period of time and could not have been reasonably anticipated.
2. To establish that the existence of abnormal weather, the Contractor must submit documentation that establishes that the weather conditions experienced fall outside of the extreme ranges of weather data published by the National Climatic Data Center for the Denver Metropolitan Area for the ten (10) year period immediately preceding the data of the Contract.
3. Regardless of actual weather conditions, any Day in which the Contractor is able to work eighty percent (80%) or more of its scheduled work force shall not be counted as an abnormal weather Day for purposes of calculating weather related time extensions.

Z. Early Completion Schedule and the Right to Finish Early

1. An Early Completion Schedule is an Initial Project Schedule that indicates the

scope of the required contract work will be completed before the contractually required completion date.

2. An Initial Project Schedule indicating an Early Completion will not be accepted without being fully resource-loaded (including crew sizes and manhours) and without the DEN Project Manager agreeing that the schedule is reasonable and achievable.
3. The City is under no obligation to accelerate its own work items to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the Contractor's accelerated work.

### 3.5 PROJECT SCHEDULE SUBMISSIONS

#### A. General

1. Submit the electronic data files (.xer), reports, and network diagrams required for each submission as described in Article 1.4 SUBMITTALS.
2. If the Contractor fails or refuses to furnish the information and schedule updates as set forth, the Contractor will be deemed unresponsive and payment may be withheld as described in Article 3.3 WITHOLDINGS / PAYMENT REJECTION.
3. Review comments made by DEN Project Controls on the schedules do not relieve the Contractor from compliance with the Contract.
4. Provide the submissions as described below.

#### B. Preliminary Project Construction Schedule Submission

1. Within ten (10) days after the issuance of Notice to Proceed (NTP), submit the Preliminary Project Construction Schedule:
  - a. If contract time is greater than 120 calendar days, submit the Schedule defining the planned operations detailed, at a minimum, for the first sixty (60) calendar days of the project for acceptance.
  - b. If contract time is shorter than 120 calendar days. submit the Schedule defining the planned operations detailed for the full contract term for acceptance.
  - c. It shall be early start and late finish constrained and logically tied as specified.
2. The Preliminary Project Construction Schedule shall form the basis for the Initial Project Construction Schedule specified herein and shall include all the required plan and program preparations, submissions and approvals identified in the contract. For example, Quality Control Plan, Site-specific Safety Plan, and Environmental Protection Plan, etc.
3. The DEN Project Manager will respond within 14 days to the Preliminary Schedule submittal with either acceptance or direction to revise and resubmit.
4. In lieu of the Preliminary Project Construction Schedule, the Contractor may, at the Contractor's own discretion, submit the Initial Project Construction Schedule at the Preconstruction Meeting.
  - a. If the Initial Project Construction Schedule is submitted in lieu of the

Preliminary Project Construction Schedule, the DEN Project Manager will respond within thirty (30) days with acceptance or direction to revise and resubmit within ten (10) days.

5. Acceptance of Preliminary Project Construction Schedule will not constitute approval of Schedule of Values.

C. Gantt Chart Schedule

1. Submit a time-scaled network diagram printout of the Preliminary Project Construction Schedule at the pre-construction meeting.
2. Preparation
  - a. Indicate each significant construction activity separately.
  - b. Identify first workday of each week with a continuous vertical line.
  - c. Outline significant construction activities for the contract duration.
  - d. Include skeleton diagram for the remainder of the Work, when necessary.
  - e. For a project with contract time greater than 120 calendar days, the Preliminary Schedule shall show all significant Work tasks that occur in the first sixty (60) days including, but not limited to planning, mobilization, shop drawings and technical submittals and approval time, procurement, fabrication and construction.
  - f. For a project with contract time less than 120 calendar days, the Preliminary Schedule shall show all Work tasks that occurs during the contract time including, but not limited to planning, mobilization, shop drawings and technical submittals and approval time, procurement, fabrication and construction.
  - g. It shall identify work items or milestones that affect or are affected by City, other Contractor's work, utilities, and other third parties and it shall list major submittals required by the Contract.

D. Narrative Report

1. For a project with contract time greater than 120 calendar days, the Preliminary Project Construction Schedule shall be accompanied by a narrative describing the Contractor's approach to mobilization, procurement, and construction during the first sixty (60) days.
2. For a project with contract time less than 120 calendar days, the Preliminary Project Construction Schedule shall be accompanied by a narrative describing the Contractor's approach to mobilization, procurement, and construction during the contract time.
3. The narrative shall elaborate based on durations, production rates, major equipment to be used, and shall identify all major assumptions used to develop the schedule.

3.6 Initial Project Construction Schedule Submission

A. General

1. Submit the Initial Project Construction Schedule for acceptance within thirty (30) days after issuance of NTP.
  2. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent the Work through the entire contract performance period.
  3. The DEN Project Manager will respond within 14 days with acceptance or direction to revise and resubmit.
  4. The acceptance of the schedule is for general conformity to the Contract requirements and shall not constitute any relief of any Contract requirements.
  5. Upon acceptance from the DEN Project Manager and DEN Project Controls, the Initial Project Construction Schedule shall become the Baseline Schedule for the duration of the project.
  6. The Baseline Project Construction Schedule 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 resulting in a major change that requires DEN PM approval.
    - c. When the City directs a change that affects a milestone dates specified in the Special Conditions or alters the length of a critical path.
  7. Failure to include any work item required for performance of this Contract shall not excuse the Contractor from completing all Work within applicable completion dates, regardless of the City's acceptance of the schedule.
  8. Failure of the contractor to have an Initial Project Construction Schedule accepted by DEN Project Manager will be considered cause for withholding progress payment.
- B. Preparation:
1. Project Duration
    - a. Extend schedule from NTP date to Substantial Completion.
    - b. Contract completion date shall not be changed by submission of a schedule that shows an early or late completion date, unless specifically amended by Change Order.
  2. Activities
    - a. Treat each building floor or separate area as a separate numbered activity for each main element of the Work.
    - b. 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 twenty (20) days, unless specifically allowed by DEN Project Manager. Include estimated



time frames for the following activities:

- 1) Preparation and processing of submittals.
- 2) Mobilization and demobilization.
- 3) Purchase of materials.
- 4) Delivery of materials.
- 5) Fabrication of materials
- 6) System shutdown request and approval
- 7) Utility/system interruptions
- 8) Installation of Work
- 9) Work by City, other contractors, utilities and other third parties that may affect or be affected by Contractor's activities.
- 10) Startup, Testing and Commissioning
- 11) Punch list and Final Completion.

4. Critical Path Activities:

- a. No more than twenty-five (25) percent of the activities may be on the critical path, unless approved IN WRITING by DEN Project Manager.
- b. Identify critical path activities, including those for interim completion dates.
- c. Scheduled start and completion dates shall be consistent with Contract milestone dates.

5. Procurement Activities:

- a. Include procurement activities for long lead items and major items as separate activities in schedule.
- b. Procurement cycle activities including, but are not limited to, submittals, approvals, purchasing, fabrication and delivery.
- c. May have a duration greater than twenty (20) calendar days and should represent the time to complete the procurement cycle as described above.

6. Submittal Review Time:

- a. Include review and re-submittal times indicated in Technical Specification 013300 "Submittal Procedures" in schedule unless time frame is reduced by approval of the DEN Project Manager.
- b. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.

7. Substantial Completion:

- a. Indicate date established for Substantial Completion.

8. Milestones:

- a. Include milestone indicated in the Contract Documents, including, but not limited to, NTP, Phasing Milestones and Substantial Completion.

9. Constraints:

- a. Include constraints and work restrictions indicated in the Contract Documents and show how the sequence of the Work is affected:
    - 1) Phasing:
      - a) Arrange activities in schedule in Work Breakdown Structure (WBS) by Area, Phase or Bid Schedule.
      - b) Coordinate phasing and constraints with those established in Technical Specification Section 011400 "Work Sequence and Constraints".
    - 2) Products Ordered in Advance:
      - a) Include separate activity for each product.
      - b) Include delivery date indicated in Technical Specification Section 011100 "Summary of Work".
      - c) Delivery dates indicated stipulate the earliest possible delivery data.
    - 3) Owner-furnished Products:
      - a) Include separate activity for each product.
      - b) Include delivery date indicated in Technical Specification Section 011100 "Summary of Work".
      - c) Delivery dates indicated stipulate the earliest possible delivery date.
  10. Resource Loading of Construction Schedule:
    - a. Coordinate with DEN Project Controls and DEN Project Manager for the requirements.
    - b. Activities shall be resource loaded with direct man-hours required to perform the physical construction of the project. Indirect man-hours shall not be included as resources to activities.
- C. Schedule Narrative Report
1. The Initial Project Construction Schedule shall be accompanied by a narrative describing the Contractor's approach to mobilization, procurement, and construction for the project.
  2. It shall elaborate on the original assumptions of estimated quantities and production rates, hours per shift, workdays per week, and types, number and capacities of major construction equipment to be used and whether the Contractor plans to work weekends.
- 3.7 MONTHLY PROGRESS CONSTRUCTION SCHEDULE UPDATES
- A. The Contractor shall submit a monthly progress schedule at the end of each month following the issuance of NTP.

- B. At the end of each month, the Contractor and DEN Project Manager shall agree on the progress of the work and the Contractor shall update the Construction Schedule accordingly.
- C. This review does not constitute an acceptance of the Monthly Progress Schedule update and shall not be used for the purpose of modifying the accepted Baseline Project Construction Schedule.
- D. Failure of the Contractor to have a Monthly Progress Construction Schedule accepted by the DEN Project Manager will be considered cause for withholding progress payment per Article 306 - Working Hours and Schedules and Article 909 - Additional Withholding of Progress Payments of the General Contract Conditions, 2011 Edition.
- E. The Contractor's monthly progress schedule shall include a written narrative describing the overall progress of the Work, provide a critical path analysis, explain the basis for determining construction logic, discuss significant problems with proposed corrective action, and how the status of major changes and any other changes are affecting the project schedule.
- F. 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 time.
- G. Minor revisions submitted at monthly progress review meeting are not considered as changes in this context.
- H. If after submitting a request for change to the Construction Schedule, the DEN Project Manager does not agree with the request, the DEN Project Manager will schedule a meeting with the Contractor to discuss the differences.
- I. If a settlement cannot be reached on the change in the Construction Schedule, or if the Contractor has failed to submit revisions to the network, the DEN Project Manager has the option of providing suggested logic or duration changes in all subsequent update schedules.
- J. The suggested logic and/or duration times will remain in effect until the change in the Construction Schedule is settled or until the logic and duration are superseded.

### 3.8 THREE WEEK LOOK-AHEAD SCHEDULE

- A. The Contractor shall provide the DEN Project Manager an electronic copy prior to and a minimum of four (4) hard copies of the Contractor's Three (3) Week Look-Ahead

Schedule for review at the DEN Project Manager's weekly progress meeting.

- B. The schedule shall be generated from Primavera P6 in time-scaled network diagram bar chart format based on the approved accepted CPM Baseline Project Schedule and shall include dates of activities in progress, work to be completed within the period, percent complete of activities, and responsible subcontractor for the activities, testing activities, and anticipated dates of inspection by DEN and other agencies.

### 3.9 AS-BUILT CONSTRUCTION SCHEDULE:

- A. After all Contract Work items are complete, the contractor shall submit an as-built Project Construction Schedule that reflects the actual sequence of construction activities, includes all change order scope of work changes and shows actual start and finish dates for all work items and milestones for acceptance by the DEN Project Manager.
- B. The basis for the As-built Construction schedule will be the approved Monthly Progress Schedules.

### 3.10 RECOVERY SCHEDULE

- A. When a monthly progress schedule update indicates the Work is behind the current approved schedule, submit a separate Recovery Schedule indicating means by which Contractor intends to regain compliance with the schedule.
- 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 Contract Documents.
- C. If the early finish date for any work item or the substantial completion date does not fall within the Contract Duration, the sequence of work or duration shall be revised by the Contractor through concurrent operations, additional manpower, additional shifts or overtime, additional equipment, or alternative construction methods until the schedule produced indicates that all significant contract completion dates, occupancy dates and milestone dates will be met.
- 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.
- E. The narrative shall be submitted in accordance with Article 1105 – Time Extensions in the General Contract Conditions, 2011 Edition.

### 3.11 REQUEST FOR TIME EXTENSION

- A. General:
  - 1. Provide a justification of delay to the DEN Project Manager, in accordance with

the Contract provisions and clauses, for approval within 10 days of a delay occurring.

2. Prepare a time impact analysis for each DEN Change Directive, Change Notice and Contractor's Change Request to justify time extensions.
3. Added work by the City does not necessarily entitle Contractor to a Time Extension, unless the Contractor can prove that this new added scope impacts the current critical path without manipulating any of the logic and relationships in the most recent and approved schedule.
4. The City may reject any Time Extension Request that does not include a detailed and a clear time impact analysis that shows direct impact to the most current critical path along with a detailed productivity rate calculation to justify the requested time to execute such added work.
5. If the Contractor is granted an extension of time for completion of any milestone or contract completion date under the provisions of the Contract, the determination of the total number of extended days will be based upon the current analysis of the schedule and upon all data relevant to the extension. Such data shall be incorporated into the next monthly update of the schedule.
6. The Contractor acknowledges and agrees that delays in work items that, according to schedule analysis, do not affect any milestone dates or the Contract completion date shown on the CPM Network Schedule at the time of the delay will not be the basis for a Contract extension.

B. Justification of Delay

1. Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify the schedule activities impacted.
2. Show that the event that caused the delay/impact was the responsibility of the City.
3. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion dates.
4. Multiple impacts shall be evaluated chronologically; each with its own justification of delay. With multiple impacts, consider concurrency of delay.
5. A time extension and the schedule fragment become part of the project schedule and future schedule updates upon approval by DEN Project Controls.

C. Time Impact Analysis (Prospective Analysis)

1. Prepare a time impact analysis for City approval based on industry standard AACE 52R-06. Use a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis.
2. If DEN Project Controls determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis.
3. Unless approved by the DEN Project Controls, no other changes will be incorporated into the schedule being used to justify the time impact.

D. Fragmentary Network (FragNet)

1. Prepare a proposed fragment for time impact analysis. The proposed fragment shall sequence new activities into the project schedule to demonstrate the

- influence of the delay or impact to the project's contractual dates.
2. Clearly show how the proposed fragment shall be tied into the project schedule, including the predecessors and successors to the fragment activities.
  3. Obtain City approval of the proposed fragment before incorporating it into the project schedule.

E. Time Extension

1. Time extensions will not be granted until after the City has approved the Justification of Delay, including the time impact analysis.
2. No time extension will be granted unless the delay consumes the available Project Float and extends the projected finish date ("Substantial Completion" milestone) beyond the Contract Duration.
3. The time extension will be in calendar days.
4. Actual delays that the City determines are caused by the Contractor's own actions and result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or interim milestone date.

F. Impact to Early Completion Schedule

1. No extended overhead will be paid for delay prior to the original Contract Substantial Completion date.

3.12 FAILURE TO ACHIEVE PROGRESS

A. General:

1. If the progress falls behind the approved baseline project schedule for reasons other than those that are excusable within the terms of the Contract, the City may require submittal of a written recovery plan for approval.
2. The plan shall detail how progress shall be recovered, including which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

B. Artificially Improving Progress

1. Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited.
2. Indicate assumptions made and the basis for logic, constraint, duration, and calendar changes used in the creation of the recovery plan.
3. Additional resources, manpower, and daily and weekly work hour changes proposed shall be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

C. Failure to Perform

1. Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory

performance rating and/or may result in Non-Conformance Report for corrective action directed by DEN Project Controls pursuant to other Contract provisions.

#### 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 013210**

## **SECTION 013223.11 – CONSTRUCTION LAYOUT AND AS-BUILT SURVEYS**

### **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. This Section covers Denver International Airport (DEN) procedures and accuracy requirements for survey services for construction layout, and as-built.
- B. Before commencing any field surveys on DEN property, the Contractor must coordinate a pre-survey preparation activities meeting. This meeting is to be arranged through the DEN Project Manager's Office with the attendance of the Contractor and the DEN Survey Section. The Contractor is responsible for obtaining DEN related survey guidance, Access to DEN survey network, Primary Control, projection parameters, and training materials from the DEN Survey at the pre-survey meeting and/or prior to beginning any survey work.
  - 1. Survey Project Checklist, provided as part of this Specification, must be reviewed at the pre-survey preparation activities meeting. (Refer to Article 1.11.)

#### **1.3 REFERENCE DOCUMENTS:**

- A. Section 013223.15 "Survey Information".
- B. Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples".
- C. Latest version of Federal Aviation Administration Advisory Circular 150/5300
- D. Latest Version of DEN BIM DSM (Design Standards Manual)
- E. Latest Version of Colorado Department of Transportation (CDOT) Survey Manual.
- F. Latest Version of Minimum Standard Detail Requirements for ALTA/ NSPS Land Title Survey

#### **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.



B. Survey Statement of Work (SSOW):

1. The Contractor must develop a complete SSOW and submit it to the DEN Project Manager. The SSOW is the Contractor's written description of the Contractor's methodology for surveying services that must be provided as part of the Project, including specific features that must be surveyed, action items, timelines necessary airport resources and general information.
2. SSOW must be submitted by the Contractor prior to commencement of any survey or layout work on the site.
3. The SSOW will be accepted by the DEN Project Manager.
4. Under no circumstances must the Contractor begin work until the SSOW has been accepted.

C. Survey and Quality Control Plan (SQCP):

1. The Contractor must develop a complete SQCP and submit it to the DEN Project Manager. The SQCP is the Contractor's written description detailing the Contractor's methodologies for data collection, data safeguarding and quality assurance. Provide insight on how the Contractor must completely check all data to ensure it is complete, reliable, and accurate. Identify data safeguards used to protect the sensitive and safety critical data. Utilize a checklist based quality control process with definable and repeatable standards for each element ensuring consistency of work between different personnel within an organization. Submit the plan in a non-editable PDF.
2. SQCP must be submitted by the Contractor prior to commencement of any survey or layout work on the site.
3. The SQCP will be accepted by the DEN Project Manager.
4. Under no circumstances must the Contractor begin work until the SQCP has been accepted.

D. Weekly Project Status Report:

1. Contractor must submit a project status report in compliance with FAA AC 150/5300-18B to the DEN Project Manager every Monday by 2:00 P.M. Mountain Time, from the date of the task order until the date of Substantial Completion
2. The Weekly Project Status Report must use format from AC 150/5300-18B

E. Final Project Survey Report:

1. The Final Project Survey Report, must use format from AC 150/5300-18B
2. Final Project Survey Report must be stamped and wet signed by a current Colorado Registered Professional Land Surveyor.

F. SURVEY DELIVERABLES:

1. Contractor must submit all of the following deliverables.
2. All raw files: GPS and Levels that is compatible with Trimble Business Center.
3. If combining x, y from GPS and z from Levels, provide field notes and data that shows where this data came from to verify values. The GPS point numbers must match to the Level descriptions.

4. As-built or as-constructed survey submittals must need to be in both Portable Document Format (PDF) and in AutoCAD Civil 3D. Refer to current and criteria document for direction on PDF production.
5. All copies of original pages of field notes or electronic field notes must be in (PDF).
6. Scanned copies of all original field notebooks used for this Project must be submitted at the end of Contract.
7. All as-built points files must be in either CSV or TXT format.
8. All CAD drawings must be in current approved Autodesk Civil 3D format.
  - a. CAD layers are specified in DEN BIM Design Standards Manual
  - b. DEN must provide the Autodesk Civil 3D drawing template.
9. The as-built survey must follow the most recent Minimum Standard Detail Requirements for ALTA/ NSPS Land Title Survey for all sections, as far as they are applicable to the scope of work for the project and site in question.
10. Documentation in accordance with "Table A, Optional Survey Responsibilities and Specifications" (Refer to Article 1.11.) is filled out with the required content to be submitted.
11. Hard copy of all documentation stamped and wet signature by licensed PLS responsible for the work.

#### 1.5 QUALITY REQUIREMENTS

- A. Contractor – Company contracted to perform survey work under the direct supervision of a Colorado Registered Professional Land Surveyor with current FAA "Idle Certification"
- B. Subsurface Utilities Engineering (SUE): Refer to Section 011810 "Utilities Interface" for information related to underground utilities.
- C. Surveying accuracies and tolerances in control surveys, construction layouts: See CDOT Survey Manual for acceptable tolerances.

#### 1.6 DEN SITE SURVEY REQUIREMENTS

- A. A site survey, construction survey, or construction as-built survey providing horizontal location and level information of surface features and both above and below ground services and utilities must be completed. This must also be annotated with information (where applicable) relating to the size, direction of and material type.
  1. When collecting utilities, Contractor must be responsible to have all exposed and installed utilities surveyed prior to being covered. If Contractor fails to survey utilities, DEN Project Manager can have the Contractor uncover the utilities so they can be surveyed.
  2. Any temporary works that remain at the completion of the project must also be surveyed.
  3. FAA and DEN Survey codes must be provided by The DEN Project Manager via

DEN Survey or Designee and must be used throughout the project by Contractor for as surveyed features.

4. The most current DEN Civil 3D template must be provided by The DEN Project Manager via the DEN BIM team. All DEN BIM requirements must be met.

## 1.7 DEN ALIGNMENT MONUMENTATION

- A. Alignment monuments must be set at their corresponding coordinates as shown on the monumentation sheet of the Alignment Plans. When monumenting the Alignment, the Contractor must verify that the latest set of Alignment plans are being used. After the Alignment monument locations are staked in the field, any necessary utility locates should be called for prior to setting the monument.
- B. All Alignment monuments set must be established within the Minimum Horizontal Accuracy Tolerance as required in this chapter for a CDOT Class B – Secondary survey.
- C. Alignment monuments must be set at the locations as shown on the Alignment Plans, which include the following locations:
  1. 1. All angle points or changes of directions.
  2. 2. At the beginning and ending of curves.
  3. 3. At the points of change of direction or changes of radius of any boundary defined by circular arcs.
  4. 4. Not to exceed 1400 feet apart along any straight boundary line.
  5. 5. Any other points as approved by the Survey Coordinator due to field conditions encountered during setting of the Alignment monumentation.
- D. Alignment monuments must have a witness post installed within 2 ft and facing the monument, or as accepted by DEN Survey. For setting easement monuments, the witness post requirement may be waived by DEN Survey.
- E. Use Orange Carsonite witness post:
- F. All Alignment monument caps set in the field must be stamped with the following:
  1. 1. DEN Project Code number
  2. 2. Point number as shown on the Right of Way Plans
  3. 3. Colorado PLS number setting the monument
- G. All Alignment monuments set in the field must be shown on the Final set of Alignment Plans in accordance with the CDOT Right of Way Manual, Chapter 2 – ROW Plans. The Colorado PLS who is in responsible charge for setting the Alignment monuments must stamp her/his number on the monument cap, and must certify on the Alignment Plans to setting of the Alignment monuments in the field.
- H. The Contractor in responsible charge of the Alignment Plans and the Contractor in responsible charge of setting the Alignment monuments in the field might not be the same individual. Therefore, care must be taken to ensure any monuments set in the

field at locations different than that shown on the Alignment Plans are communicated to the Alignment plans section, and the final Alignment Plans are corrected to show these new monument locations and descriptions prior to submitting the plans to DEN Survey.

- I. Alignment monuments, witness posts, and monument box materials must be furnished by Contractor.

## 1.8 FEATURES TO BE RECORDED

- A. Surface and Above Ground Features: The survey of surface features must include, but is not limited to:

1. Structures and Surfaces – paths, driveways, retaining walls, slabs/paved areas, significant structural footings (plinths etc.), poles/ floodlighting.
2. Drainage Structures – headwalls, open drains, grated drains, culverts.
3. Roads – edge of pavement, curbs, shoulders, line-marking, bridges, road furniture (NOTE – the top back and bottom face of curb, and all water channels must be surveyed and recorded).
4. Buildings – footprints, awnings, overhangs, columns, external fixtures (stairs, ramps, plant, etc.).
5. Fences and Gates – AOA, security, general fencing, gates and handrails.
6. Aircraft Pavements and Movement Area Structures – finished surfaces, pavement markings, airfield markers/signage/ navigational aids, PLB and other aeronautical infrastructure;
7. Topographical Features – general topography, embankments, earthworks platforms and surcharge.
8. Vegetation – gardens, significant trees (>0.2' trunk diameter, decorative shrubs), vegetation stands, riparian zones.
9. Signage – road, airfield, parking, advertising, other general signage.
10. Survey Marks – survey control points used, any settlement plates/ monitoring points placed during works.
11. Airfield panel corner elevations must be derived from digital levels.

- B. Services and Utilities - Prior to any backfilling or covering, information on all underground services must be obtained and documented according to DEN's modified ASCE-SUE Standards, including but not limited to:

1. Electrical (LV and HV) – top of conduit every fifty feet including horizontal and vertical bends, cables and conduits, pits/ manholes and chambers, HV cable joints, earth points and earth mats, substations/ transformers and surrounding pad, pillars, cabinets and switchboards, top of conduits.
2. Fuel Control – top of conduit every fifty feet including horizontal and vertical bends, cables and conduits, pits/ manholes and chambers, cabinets, emergency shut-off points.
3. Communications - top of conduit every fifty feet including horizontal and vertical bends, fiber optic, microducts, comms cables and conduits, pits/ manholes and chambers, top of conduit casing/housing.
4. Drainage – top of pipes at fifty-foot intervals and at every vertical and horizontal

- bend, inspection openings, pits/ manholes and chambers, roof water drainage (downpipes, small pits/ grates).
5. Fuel – top of pipes every fifty feet including horizontal and vertical bends, all weld points with weld numbers documented in the point description and in the field notes, pits/ manholes and chambers, valves, hydrants, earth points, test points.
  6. Sewer (note whether gravity or force main) – top of pipes every fifty feet including horizontal and vertical bends, pipes, pipe inverts, pipe outflows, inspection openings, pits/ manholes and chambers, vent pipes, pump stations and associated components.
  7. Water (differentiate between potable and recycled) – top of pipes every fifty feet including horizontal and vertical bends, pits/ manholes and chambers, valves (and type), meters, taps, hydrants, tanks, pumps, irrigation control.
  8. Compressed Air – top of pipes every fifty feet including horizontal and vertical bends, hoses and other fixtures.
  9. Natural Gas / Petroleum– top of pipes every fifty feet including horizontal and vertical bends, valves, tanks, meters.
- C. Sufficient points must be recorded to ensure that the extremities of all surface features, structures and footings are clearly defined and all bends, intersections, and changes of gradient are accurately recorded. The distance between points of location should generally be about 50 feet and must not exceed 100 feet. All curves must be accurately defined using a minimum of three points (two tangent points and one midpoint).
- D. Where actual positions of linear features deviate from a straight line, sufficient additional points of location must be provided to define the deviation – horizontal and/or vertical change in directions.
- E. For systems, utilities, and features not identified herein, refer to PM for direction on capture requirements
- 1.9 SURVEY METHODOLOGY – SERVICES AND UNDERGROUND FEATURES
- A. Sufficient points must be recorded to ensure that the extremities of all pits, manholes, and any other features related to the service are clearly defined and all bends, joints, intersections, changes of gradient, and fittings on or along the service, pipe or conduit are accurately recorded. All curves must be accurately defined using a minimum of three points (two tangent points and one midpoint). Where actual positions of linear features deviate from a straight line, sufficient additional points of location must be provided to define the deviation – horizontal and/or vertical change of directions.
  - B. The maximum distance between points of location along services must not exceed 50 feet. Horizontal and vertical locations must be surveyed on the top of the utility and must be labeled as “top”. Inverts measurements must also be taken in manholes and must be labeled.
  - C. The Contractor must record and annotate all services and utilities with information relating to the size, direction of and material type. The Contractor must record and clearly differentiate between the communication service providers and DEN and/or

FAA communications infrastructure.

- D. The Contractor must record the size and orientation of all grates, pits and manholes. Grates and pits must be recorded using a minimum of three corner or edge points. Pit/ manhole chambers only need to be located and where the extents of the chamber extend past the extremities of the pit at surface level. In all instances, any thrust blocks or concrete cover/ protection over services must be located, showing depth.

#### 1.10 EXISTING FEATURES AND SERVICES

- A. Existing Services: where the existence of services and other features on the site of the Work and the Work exposes or interacts with these existing services, the Contractor must locate and record the details of all such features and services.
- B. Tunnel Boring: The Contractor must provide records (logs, profiles etc.) relating to all tunnel boring undertaken as part of the Project. Where appropriate this information must be incorporated into the as-built site survey. Where the contract drawings do not show the existence of certain utilities and features and the Work exposes or interacts with the utilities and features, these must be located and recorded by the Contractor.
- C. Services Alteration/ Abandonment / Demolition: Where existing infrastructure, building services and/or utilities are demolished or services realigned or abandoned this information must be reflected within the as-built site survey. A distinction must be made between services (or part services) which have been abandoned (but left in the ground) and those that have been physically removed.

1.11 SURVEY CHECK LIST

	Yes	No	N/A	Project Kickoff Phase
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor meet with DEN PM obtain the data standards and general requirements for data gathering?
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor meet with Airport Survey Office to obtain airport survey control points, projection parameters, and airport survey training materials?
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor provide Survey Statement of Work to DEN PM?
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor provide Geodetic Verification Survey to DEN PM?
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor provide Survey Control Plan to DEN PM?
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor provide Imagery Plan to DEN PM? (Only required if collecting aerial imagery)?
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did the FAA accept survey plans?
	Yes	No	N/A	Construction Phase (As-Built)
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor perform field survey of project site to collect accurate as-built data?
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did the Contractor provide DEN PM with subsurface utility data?
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Each week, did the Contractor provide DEN PM with Project Status Reports?
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did the Contractor provide DEN PM with 25% as-built data in both CADD and GIS formats including all attribute information and metadata?
12a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did DEN PM report 25% QA findings via email to Contractor?
12b	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If required, did the Contractor provide DEN PM with 50% as-built data in both CADD and GIS formats including all attribute information and metadata?
12c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If applicable, did DEN PM report 50% QA findings via email to Contractor?
12d	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If required, did the Contractor provide the DEN PM with 75% as-built data in both CADD and GIS formats including all attribute information and metadata?
12e	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If applicable, did DEN PM report 75% QA findings via email to Contractor?
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did the Contractor provide DEN PM with 100% as-built data in both CADD and GIS formats including all attribute information and metadata?
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did Contractor provide DEN PM with a completed Final Survey Report?
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did DEN PM report QA findings via email to Contractor?

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION LINES AND GRADES

- A. The Contractor must make surveys and layouts as necessary to delineate the Work. The Contractor must make the surveys for the proper performance of the Work. As a part of such surveys, the Contractor must furnish, establish, and maintain in good order survey control points that may be required for the completion of the Work subject to the approval of the DEN Project Manager as to their location, sufficiency and adequacy. However, such approval by the DEN Project Manager must not relieve the Contractor of responsibility for the accuracy of the Contractor's survey work.
- B. The DEN Project Manager must have the right to check surveys and layouts made by the Contractor prior to approving any of the Work. The Contractor must give advance notice of not less than forty-eight (48) hours to the DEN Project Manager to enable such checking prior to placing any work. The Contractor must furnish assistance as may be required for checking purposes when so requested by the DEN Project Manager.
- C. The Contractor must furnish skilled labor, instrument platforms, ladders and such other temporary structures as may be necessary for making and maintaining points and lines in connection with the surveys required.
- D. The DEN Project Manager may draw the Contractor's attention to errors or omissions in lines or grades, but the failure to point out such errors or omissions must not give the Contractor any right or claim nor must in any way relieve the Contractor of obligations according to the terms of this Contract.
- E. The Contractor's instruments and other survey equipment must have current certification from manufacturer's representative. Surveys must be performed under the direct supervision of a current Colorado Registered Licensed Land Contractor.
- F. Field Notes:
  - 1. The Contractor must record surveys in field notebooks or as electronic field notes, whichever is more appropriate to the type of survey work.
  - 2. If the DEN Project Manager finds errors in the field notes DEN must have the Contractor correct and resubmit the notes. This review does not relieve the Contractor from the responsibility of maintaining accurate survey data. Whichever method of note-taking the Contractor starts with, the Contractor must use the same method throughout the Contract duration.
- G. The DEN Project Manager may at any time use line and grade points and markers established by the Contractor. The Contractor's surveys are a part of the Work and may be checked by the DEN Project Manager or the DEN Project Manager's representatives at any time.



## 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 must be made for work under this Section. The cost of the work described in this Section must be included in the applicable contract value, work order or lump sum bid item.

END OF SECTION 013223.11



## **SECTION 013300 - SUBMITTAL PROCEDURES**

### **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 summarizes the requirements for the submittal of documents to the DEN Project Manager that are defined in these Specifications. It also describes the procedures for "supplemental" submittals.
- B. The Contractor must follow all the requirements of the procedures and the product details and keep all the submittals current and approved prior to any placement of work.

#### **1.3 SUBMITTAL SCHEDULE**

- A. The Contractor shall provide a submittal schedule within 14 days after Notice to Proceed. The Submittal Schedule shall be directly related to the CPM schedule, shall identify all the submittals, and shall include the following information for each submittal item
  1. Specification section, Contract article, or special condition.
  2. Specification Subparagraph.
  3. Item description.
  4. Date the submittal shall be submitted.
  5. Name of subcontractor or supplier.
- B. The submittal schedule shall be kept current by the Contractor and submitted with the progress payment requests.
- C. For large files that cannot be loaded or e-mailed through the electronic Project Manager application (Unifier), submit the files on a CD, DVD, or USB flash drive media.

#### **1.4 ELECTRONIC SUBMITTALS**

- A. Before the initiation of the submittal process, coordinate and insure that all submittals comply and follow the requirements of the DEN Building Information Modeling (BIM) Design Standards Manual (DSM) and the DEN BIM PXP.

- B. Submit request for progress payment applications utilizing TEXTURA software as instructed by DEN Project Manager.
- C. Submit Subcontractor's Contract information required by the City and County of Denver Small Business Office as instructed by DEN Project Manager.
- D. Submit original electronic copies of all City and County of Denver Development Department/ Building Inspection Department Approved drawings including all approvals of Deferred Submittals; including but not limited to shoring plans, Fire Protection distribution plans, and structural shop drawings to DEN Project Manager as Informational Submittals. The lack of approval of the Denver Development Services on any document shall be basis for rejection of Work and non-compliance.
  - 1. NOTE: Only original copies shall be accepted. Scans will not be accepted.
- E. Submit electronically scanned copies of all documents required by Chapter 17 "Special Inspection and Testing" of the International Building Code 2009 as amended by City and County of Denver 2011. Keep scale and clarify dimension where electronic copies are not as originally scaled and dimensioned.
- F. All submittals shall be delivered to the DEN Project Manager utilizing the Primavera Construction Manager program (PCM) as attachments and as separate file when files are too large to attach or of an electronic media that is not supported by PCM or Utilizing the EPPM Unifier software uploaded to the share drive Unifier's project site when directed by DEN Project Manager.
  - 1. Acceptable electronic formats
    - a. Print document format (pdf) shall have no security and bookmark every applicable submittal. All pages shall be completely legible and oriented to correct reading view.
  - 2. Formats are acceptable only with written permission of the DEN Project Manager or required by the BIM PXP. For files in any of the following formats, the corresponding stringency will apply:
    - a. Microsoft Office 2007 or newer. All files shall be fully compatible with Microsoft Office 2007.
      - 1) AutoCAD files shall be self-contained with no external x-references.
    - b. BIM files shall conform to the standards and formats outlined in the BIM PXP and DEN BIM DSM.
    - c. Other files pre-approved by the DEN Project Manager.

## 1.5 INITIAL SUBMITTAL

- A. Each submittal document shall include a title block showing the following information:
  - 1. Date of submittal and revision dates.

2. Contract title and number.
  3. The names of Contractor, subcontractor, supplier, manufacturer and when applicable, the seal and signature of an Engineer registered in the State of Colorado, for the involved discipline.
  4. Identification of product by either description, model number, style number or lot number.
  5. Subject identification by Contract Drawing or specification reference.
- B. On each submitted drawing, include a blank space on each sheet, three inches by four inches, in the lower right corner, just above the title block, in which the DEN Project Manager or the Designer of Record may indicate the action taken.
- C. Make submissions sufficiently in advance so that the DEN Project Manager Review may be completed not less than 30 days before Work represented by those submittals is scheduled to be performed.
- D. Allow a minimum cycle of 30 days for review of each submittal by the DEN Project Manager.
- E. Accompany submittal documents with DEN transmittal form CM-30, Submittal, which shall contain the following information:
1. Contractor's name, address and telephone number.
  2. Submittal number and date.
  3. Contract title and number.
  4. Supplier's, manufacturer's, or subcontractor's name, address and telephone number.
  5. Identification of variations from Contract Documents.
  6. Contractor's stamp and signature certifying the Contractor's review.
  7. Identification of submittal:
    - a. If the submittal is being made on a General Condition or Special Condition, reference the General or Special Condition number the first two digits of the specification section shall be 00XXXX.
    - b. If the submittal is being made under a specification section, reference the specification number, paragraph number, and subparagraph number.
    - c. If the submittal is being made under a drawing, reference the drawing(s) number and sub-number.
- F. The Contractor shall describe, at the time of submission, variations from the Contract documents in writing, separate from the submittal document. If the DEN Project Manager approves any such variations, an appropriate Contract change order shall be issued, except that if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued. If a submission contains variations and the variation column is not marked on the transmittal form, it will not be considered for review and acceptance. Along with marking the transmittal as a variation, a description must be included which outlines all the differences including maintenance and utility services along with any cost savings from an item not containing the variation.

- G. Changes in accepted submittal documents will not be permitted unless those changes have been accepted, in writing, by the DEN Project Manager.
- H. The form and quality of submittal documents shall comply with Section 013325 "Shop and Working Drawings, Product Data, and Samples."

#### 1.6 SUPPLEMENTAL SUBMITTALS

- A. Supplemental submittal documents initiated by the Contractor for consideration of corrective procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals with the appropriate primary transmittal referenced.

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

### **PART 3 - EXECUTION**

#### 3.1 CONTRACTOR'S REVIEW

- A. The Contractor shall review all submittal documents, stamp, and sign as reviewed and approved as complying with Contract Documents prior to submission to the DEN Project Manager. Submittal documents that are submitted to the DEN Project Manager **THAT HAVE NOT BEEN REVIEWED BY THE CONTRACTOR** will not be reviewed and will be returned to the Contractor. Contractor is responsible for any delays in the Project due to improperly reviewed, stamped, and signed submittals.
- B. The Owner review period will be limited to ten (10) business days from the time complete submittal documents have been submitted.
- C. The Contractor is responsible to obtain all approvals for all deferred submittals, shop drawings, and significant changes from the CCD Development Service Department.
- D. All submittals must delineate any deviation from the intended design and must submit request for substitution to address any significant variation. Refer to Title 4, Article 405 – Shop Drawings, Product Data, and Samples, and Article 406 – Substitution of Materials and Equipment of the General Contract Conditions, 2011 Edition.

#### 3.2 REVIEW BY DEN PROJECT MANAGER

- A. Submittal documents will be reviewed by the DEN Project Manager, the DEN Project Manager Team, and/or the DOR for conformance to requirements of the Contract Documents. Review of a separate item will not constitute review of an assembly in which the item functions. The DEN Project Manager will withhold approval of submittals that depend on other submittals not yet submitted. Review and acceptance will not relieve the Contractor from the Contractor's responsibility for accuracy of submittals, for conformity of submittal document to requirements of Contract Drawings

and specifications, for compatibility of described product with contiguous products and the rest of the system, or for protection and completion of the Contract in accordance with the Contract Drawings and specifications.

- B. The City, the DOR, and/or the DEN Project Manager will review the submittal documents for general conformance with the Contract Documents and mark the Action Code, sign, and date the transmittal.
- C. The Action Codes have the following meanings:
  - 1. Accepted (ACC)
    - a. The submittal conforms to the respective requirements of the contract documents.
  - 2. Accepted as Noted (AAN)
    - a. The submittal conforms to the respective requirements of the Contract Documents after changes are made in accordance with reviewer's comments. AAN submittals do not need to be resubmitted.
  - 3. Revise and Resubmit (R&R)
    - a. The submittal is unacceptable and must be revised and resubmitted.
  - 4. Rejected (REJ)
    - a. The submittal is not approved and a new submittal in accordance with the Contract Documents must be prepared and submitted.
  - 5. For Information Only (FIO)
    - a. An item is received by the DEN Project Manager but is not reviewed.

### 3.3 CONTRACTOR'S RESPONSIBILITIES

- A. Coordinate each submittal document with the requirements of the Work. Place particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and submittals of other trades including producing as needed drawings showing the relationship of the Work of different trades.
- B. Contractor's responsibility for errors and omissions in submittal documents and associated calculations is not relieved by the DEN Project Manager's review, correction, and acceptance of submittals.
- C. Contractor's liability to the City, in case of variations in the submittal document from the requirements of the Contract Documents, is not relieved by the DEN Project Manager's review and acceptance of submittals containing variations unless the DEN Project Manager expressly approves the deviation in writing, in which the DEN Project Manager describes the variation.

- D. The Contractor shall maintain a file of all approved submittal documents at the work site. The complete file of approved submittal documents shall be turned over to the DEN Project Manager with the as-built documents at the end of the job.
- E. Schedule impact due to resubmittal requirements is the responsibility of the Contractor.

#### **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 **013300**



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

### 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 preparing and submitting shop and working drawings, product data, samples, and record documents required by other specifications Sections.
  - 1. The Contractor shall submit all shop drawings, working drawings, product data, and samples, as defined in the General Conditions, to the DEN Project Manager in accordance with the requirements in the technical specifications. The DEN Project Manager will return one (1) copy of the shop drawings, working drawings and product data to the Contractor with a written transmittal.
- B. The Contractor shall not submit as shop drawings, copies or reproductions of drawings issued to the Contractor by DEN.
- C. Related Requirements
  - 1. Section 013300 "Submittal Procedures
  - 2. Section 012510 "Substitutions"
  - 3. Section 017720 "Contract Closeout"

#### 1.3 SUBMITTALS

- A. All submittals shall be delivered to the DEN Project Manager in electronic format. All submittals must be of a consistent format (all PDF). No combination of electronic file types will be allowed unless required by a specific specification section.
  - 1. Acceptable electronic formats: Comply with the electronic file formats approved by DEN Building Information Modeling (BIM) Design Standards Manual If any of the files are in any of the formats listed below then the version of the software shall be no less than identified below:
    - a. Adobe Acrobat 8.0 or newer. All files shall be fully compatible with Adobe Acrobat 8.0.
    - b. Microsoft Office 2007 or newer. All files shall be fully compatible with Microsoft Office 2007.

- c. AutoDesk AutoCAD 2007 or newer. All files shall be fully compatible with AutoDesk AutoCAD 2007.
  - d. AutoCAD files shall be self-contained with no external x-references.
  - e. BIM format outlined in the BIM Project Execution Plan (PXP)
  - f. Other files pre-approved by the DEN Project Manager.
2. Adobe Acrobat Requirements:
- a. Drawings shall have security set to "No Security." Commenting, printing, adding photos, form fields and document signing must be allowed.
  - b. PDF submittals shall be one continuous file or Portfolio. No external links are allowed.
  - c. All individual components of submittals shall be bookmarked inside the PDF file.
  - d. All original documents shall be directly converted from the original electronic format to PDF. Scanning of files shall only be allowed by the DEN Project Manager when the original electronic information is not obtainable.
  - e. Failure to comply with these requirements will result in a return of file to the Contractor for immediate revision.
3. Electronic files submitted shall correspond with DEN File Control Numbering System available from the DEN Project Manager.

B. Quantities

1. One (1) electronic submittal in Unifier containing electronic files of each shop or working drawing.
2. One (1) electronic submittal in Unifier containing electronic files of manufacturer's standard schematic drawings.
3. One (1) electronic submittal in Unifier containing electronic files of manufacturer's calculations and manufacturer's standard data.
4. One (1) electronic submittal in Unifier containing electronic files of manufacturer's printed installation, erection, application, and placing instructions.
5. Nine (9) samples of each item specified in the various specification sections, unless otherwise specified.
6. One electronic submittal in Unifier containing electronic files of inspection, test reports, and certificates of compliance.
7. Note: If manufacturer's printed information is in color, all copies of submittals must be in color.

C. Review:

1. Submittal review comments by the DEN Project Manager will be in electronic form and incorporated into the electronic submittal file.
2. Resubmittals of electronic documents shall modify the original electronic file with new information and include the DEN Project Manager's comments with appropriate responses and additional information.

#### 1.4 CHANGES

- A. Changes in products for which shop or working drawings, product data or samples have been submitted will not be permitted unless those changes have been accepted and approved in writing by the Deputy Manager of Aviation as provided in Section 012510 "Substitutions."

#### 1.5 QUALITY CONTROL

- A. Shop drawings and record documents shall be prepared to the standards of quality outlined in the specifications, DSM and BIM PXP, prepared and printed from Revit and checked in the spatial coordination format specified in the BIM PXP.
- B. Refer to DEN BIM DSM for other requirements that may be applicable to this Article.

### **PART 2 - PRODUCTS.**

#### 2.1 SHOP AND WORKING DRAWINGS

- A. Prepare shop and working drawings in an electronic format that is current and approved by DEN to a scale large enough to easily depict and annotate each of the various items.
- B. Comply per other BIM requirements for Shop and Working Drawings as established in the DEN BIM DSM.
- C. Include the following as they apply to the subject:
  - 1. Contract title, work order, and number.
  - 2. Respective Contract drawing numbers.
  - 3. Applicable specification section numbers.
  - 4. Relation to adjacent structure or materials.
  - 5. Field dimensions clearly identified as such.
  - 6. Applicable standards such as ASTM or Federal Specification number, FAA, AASHTO, and pertinent authority specifications or standards.
  - 7. Identification of deviations from the Contract Drawings and specifications.
  - 8. Drawing name, number, and revision.
  - 9. Contractor's stamp, initialed or signed, certifying:
    - a. Verification of field measurements.
    - b. Review of submittals for compliance with Contract requirements.
    - c. Compatibility of the Work shown thereon with that of affected trades.
  - 10. Blank space on each sheet per Technical Specifications Section 013300 "Submittal Procedures."
- D. Drawings of equipment and other items that contain multiple parts shall include

exploded views showing the relationship of parts and the description of the parts into the smallest units that may be purchased or serviced.

- E. Comply with all submittal requirements of Section 013300 "Submittal Procedures."

## 2.2 PRODUCT DATA

- A. Modify manufacturer's standard and/or schematic drawings to delete information that is not applicable to the Contract. Supplement standard information with additional information applicable to this Contract.
- B. Modify manufacturer's standard(s), diagrams, schedules, performance charts, illustrations, calculations, and other descriptive data to delete information that is not applicable to the Contract. Indicate dimensions, clearances, performance characteristics, and capacities. Include with the submittal electrical, plumbing, HVAC, and any other diagrams, as applicable.
- C. Modify erection, application, and placing instructions to delete information that is not applicable to the Contract or work order.
- D. Include the following:
  - 1. Contract title, work order, and number.
  - 2. Respective Contract drawing numbers.
  - 3. Applicable Contract technical specification section numbers.
  - 4. Applicable standards such as ASTM or Federal Specification number, FAA, AASHTO and pertinent authority specifications or standards.
  - 5. Identification of deviations from the Contract Drawings and specifications.
  - 6. Contractor's stamp, initialed or signed, certifying:
    - a. Dimensional compatibility of the product with the space in which it is intended to be used.
    - b. Review of submittals for compliance with Contract requirements.
    - c. Compatibility of the product with other products with which it is to perform or which will be next to it.
    - d. The products electrical, plumbing, control and HVAC requirements conform to Contract Documents and the necessary utilities are provided for in the Contract Documents.
- E. Comply with all submittal requirements of Section 013300 "Submittal Procedures."

## 2.3 SAMPLES

- A. Submit samples of sizes and quantities to clearly illustrate full color range and functional characteristics of products and materials including attachment devices.
- B. Erect field samples and mockups at the work site as specified in specification Sections and at locations acceptable to the DEN Project Manager. All field samples shall be

erected in a location that will be readily visible throughout the life of the Contract to allow comparison of the Work as it progresses to the field sample. Field samples and mockups may be incorporated into the Work at Contractor's risk if approved by DEN Project Manager.

- C. The Contractor shall verify, through appropriate inspections and tests, that the samples submitted meet the specifications and shall provide inspection and test data with the samples. The review and comments on the sample shall not relieve the Contractor of the Contractor's responsibility for completion of the Contract.
- D. Show the following information:
  - 1. Contract title and number.
  - 2. Respective Contract drawing numbers.
  - 3. Applicable technical specification section numbers.
  - 4. Applicable standards such as ASTM or Federal Specification number.
  - 5. Identification of deviations from the Contract Drawings and specifications
  - 6. Contractor's stamp, initialed or signed, certifying:
    - a. Dimensional compatibility of the product with the space in which it is intended to be used
    - b. Review of submittals for compliance with Contract requirements
    - c. Compatibility of the product with other products with which it is to perform or which will be next to it
  - 7. If multiple samples are submitted and the DEN Project Manager is requested to make a choice, each sample shall have a unique identification number attached to it so the returned transmittal can state the identification number of the accepted sample and the Contractor will know which one it is.
- E. Comply with all submittal requirements of Section 013300 "Submittal Procedures."

## **PART 3 - EXECUTION**

### **3.1 CONTRACTOR RESPONSIBILITIES**

- A. Verify field measurements, catalog numbers, and similar data.
- B. The Contractor shall not start work for which submittals are required until a transmittal has been received by the Contractor marked with the Action Code ACCEPTED or ACCEPTED AS NOTED by the DEN Project Manager.
- C. Before making submittals, ensure that the products will be available in the quantities and at the times required by the Contract.
- D. Submit final, corrected, electronic copies of Contract and shop and working drawings showing the Work as actually installed, placed, erected, and applied. Refer to Section 017720 "Contract Closeout."

### 3.2 REVIEW BY THE DEN PROJECT MANAGER

- A. One (1) electronic copy of the marked-up shop and working drawing and one (1) electronic copy of the product data will be returned to the Contractor by the DEN Project Manager. Only the transmittal form appropriately marked with the Action Code and comments, if any, will be returned on sample submittals.
- B. Contractor's responsibility for errors and omissions in submittals for compatibility will not be reduced, waived or otherwise limited by the review and acceptance of submittals by the 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 **013325**

## **SECTION 013510 - CONSTRUCTION SAFETY**

### **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 and the basis for reviews by the DEN Project Manager.
- B. For projects enrolled under DEN Rolling Owner Controlled Insurance Program (ROCIP) reference the Contract Special Conditions for all safety requirements.
- C. 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 Site Specific Safety Plan shall be submitted and approved under the general Contract 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 Site Specific 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 Site Specific

Safety Plan has been accepted by the DEN Project Manager.

- B. The Contractor shall provide six (6) copies of the Contractor's Site Specific 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 Site Specific 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 Site Specific 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.

## 1.5 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 Site Specific Safety Plan.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 IMPLEMENT CONTRACTOR'S OPERATIONAL SAFETY PLAN

- A. Implement the approved Contractor's Operational Safety Plan as described in Article 1 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 and 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

### 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

## **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 013510

## SECTION 014100 - REGULATORY 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. 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 projects at Denver International Airport.
- 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 Project bidding or Task Order pricing or GMP established whichever is latest, and as specifically related.

#### 1.3 RELATED SECTIONS

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

#### 1.4 BUILDING CODE

- A. All design and construction work shall be governed by the Building Code for the City and County of Denver, latest edition. This is based upon the International Building Code of the International Code Council with Denver Amendments to this code. Appendix N of the Denver Amendments addresses Construction of Airport Buildings and Structures.
  - 1. This Contract shall be based on the most current published version of the ICC series as Amended by The City and County of Denver.

#### 1.5 DENVER BUILDING DEPARTMENT

- A. For review and approval of all construction documents for compliance to the Denver

building code:

## 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 the responsibility of the Contractor. The policies all reference the International Fire Code (IFC).

1. “?Hot work”, which is defined as the operation of any equipment or tool that creates sparks, hot slag, or radiant or convective heat as a result of the work. This includes, but is not limited to, welding, cutting, brazing, or soldering.
2. Use and storage of compressed gas for both temporary storage and permanent facility installation. This includes, but is not limited to, flammable gas (excluding propane-LPG), oxidizer (including oxygen), and inert and/or simple asphyxiates.
3. Tank installation, which includes 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](mailto: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 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 014210 - REFERENCED MATERIAL

### 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 REFERENCED MATERIAL

- A. City and County of Denver, Department of Aviation, Standard Specification for Construction, General Contract Conditions
- B. The following documents may be available for examination at the Owner's offices unless otherwise noted. The referenced material and documents are not part of the Contract Documents unless otherwise specified.

- 1. Environmental Impact Statement (EIS).
- 2. Geotechnical Reports:
  - a. Borings, other field and laboratory explorations, and investigations have been made to indicate subsurface materials at particular locations. Explorations and investigations conducted by designers and their subconsultants are solely for the purpose of study and design.
  - b. The subsurface exploration and investigation information is presented or made available to indicate some of the conditions that may be encountered during construction and is offered as supplementary information only. Geotechnical information presented in the referenced material represents the opinion of soils consultants as to the character of the materials encountered. Subsurface information was directly obtained only at the specified location and necessarily indicates subsurface conditions only at the respective plan location, depths penetrated and only at the time of the exploration.
  - c. Neither the City nor the Designers assume any responsibility whatever in respect to the sufficiency or accuracy of borings made, or of the logs of test borings, or of other investigations, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout such area, or any part thereof, or that unforeseen developments may not occur. It is expressly understood that the making of deductions, interpretations, and conclusions from all of the accessible factual information, including the nature of the materials to be excavated, the difficulties of doing other work affected by the geology, groundwater elevations and other subsurface conditions at the site of the Work are the Contractor's sole responsibility.

- d. Information derived from inspection of logs of borings, topographic maps, technical memorandum, reports, or plans showing information of the subsurface of site conditions will not relieve the Contractor from any risk or from properly examining the site and making such additional investigations as the Contractor may elect or from properly fulfilling all the terms of the Contract Documents.
3. Available Conceptual Utility and Drainage Reports.
4. DEN Building Information Modeling (BIM) Design Standards Manual (DSM)
5. Woolpert, Inc. Report - "A Low Distortion Projection for Denver International Airport (DEN)", dated 12/10/2010.

## **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 014210**



## 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 Advertisement for Bids.
- 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

<b>Abbreviation</b>	<b>Definition</b>
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

<b>Abbreviation</b>	<b>Definition</b>
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

<b>Abbreviation</b>	<b>Definition</b>
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. 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. 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 Contract 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.

#### 1.3 SCHEDULE OF REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO), 444 North Capitol Street, NW, Suite 249, Washington, DC 20090:
  - 1. AASHTO M 36–Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains.
  - 2. AASHTO M216–Standard Specification for Lime for Soil Stabilization.
  - 3. AASHTO T26–Standard Method of Test for Water to be Used in Concrete.
  - 4. AASHTO T84–Specific Gravity and Absorption of Fine Aggregate.
  - 5. AASHTO T85–Specific Gravity and Absorption of Coarse Aggregate.
  - 6. AASHTO T103–Soundness of Aggregates by Freezing and Thawing
  - 7. AASHTO T219–Standard Methods of Testing Lime for Chemical Constituents

and Particle Sizes.

- B. 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.
- C. 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. ASTM A 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.
- D. American Welding Society (AWS), 550 NW LeJeune Road, Miami, FL 33135 AWS Code for Welding in Building Construction (Structural Welding Code).
- E. Concrete Reinforcing Steel Institute (CRSI) 933 N. Plum Grove Road, Schaumburg, IL 60195, (312) 490-1700:
1. Manual of Standard Practice.
- F. Colorado Department of Transportation (CDOT) Division of Administration, Office of Bid Plans, 4201 E. Arkansas Avenue, Denver, CO 80222:
1. Standard Specifications for Road and Bridge Construction (latest edition) Colorado Standard Plans, M&S Standards.
- G. 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 014230 - DEFINITIONS AND CONVENTIONS

### 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. This Section contains a list of definitions of words or phrases and grammatical or contextual conventions commonly used in these Contract Documents.

#### 1.3 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Alphabetical Listing of Definitions:
  - 1. **As indicated:** Shown on the drawings by graphic indication, notes, or schedules, or written in the specifications or elsewhere in the Contract Documents.
  - 2. **As directed, as approved, as requested:** Unless otherwise indicated, these terms imply "by the DEN Project Manager" and require that an instruction be obtained by the Contractor from the DEN Project Manager.
  - 3. **Concealed:** Embedded in masonry, concrete, or other construction; installed in furred spaces; within double partitions or hung ceilings; in trenches; in crawl spaces or in enclosures.
  - 4. **Ensure:** To make certain in a way that eliminates the possibility of error.
  - 5. **Exposed:** Not installed underground or "concealed" as defined above.
  - 6. **Furnish or Provide:** To supply, install and connect complete and ready for safe and regular operation of particular work unless specifically otherwise noted.
  - 7. **Indicated, Shown, or Noted:** As depicted on drawings or specifications.
  - 8. **Install:** To erect, mount and connect complete with related accessories.
  - 9. **Or equal, or approved equal:** Refers to products which, in the opinion of the DEN Project Manager, are similar in all respects to products specified by proprietary brand name. Refer to Section 012510 "Substitutions" for procedures for submittal of proposed substitutions.
  - 10. **Rework:** To repair existing items or work required to be removed and replaced in order to accomplish the Work in accordance with the Contract Documents.
  - 11. **Related Work:** Includes, but not necessarily limited to, mentioned work associated with, or affected by, the Work specified.
  - 12. **Reviewed, Satisfactory, Accepted, or Directed:** Assumes by or to the DEN Project Manager.
  - 13. **Similar, or Equal:** Same in materials, weight, size, design, construction, capacity, performance, and efficiency of specified product.

14. **Supply:** To purchase, procure, acquire and deliver complete with related accessories.
15. **Unless Otherwise Indicated and Unless Otherwise Noted:** General note to perform work as indicated or shown on drawings or in specifications unless specifically directed otherwise elsewhere in the Contract Documents; may be abbreviated "U.O.N.", "U.O.I.", or "U.N.O."

C. BIM Model Definitions:

1. **Building Information Model (BIM):** BIM is a digital representation of the physical and functional characteristics of the Project and is referred as a Model(s), which term may be used to describe a Model Element, a single Model or technology used to create the Model.
2. **Design Model:** A Model that has reached the stage of completion that would customarily be expressed by an architect or engineer in two-dimensional Construction Documents.
3. **Construction Model:** The equivalent of shop drawing and other information useful to construction. A model that consists of data imported from a "Design Model or", if none exist, from a designer's "Construction Document".
4. **Federated Model:** Distinct component models "linked" together in such a manner that the linked data sources so not lose the indent or integrity by being so linked.
5. **Level of Development (LOD):** LoD describes the level of completeness to which a Model Element is developed.
6. **Model Element:** Is a portion of the BIM representing a component system or assembly within a building or building site.
7. **Model Element Author:** The party responsible for developing the content of a specific Model Element to the LoD for a particular phase of the Project.

1.4 BIM REFERENCE STANDARDS

- A. Refer to the DEN BIM Design Standard Manual (DSM) for the proposed minimum requirements of the BIM Execution Plan. The execution plan shall be further developed jointly with DEN and the Contractor to specifically address the administrative steps necessary to provide comprehensive BIM system before during and after construction.

1.5 CONVENTIONS

A. Specifications Format:

1. In order to standardize the location of information in the Contract Documents, the specifications generally are organized in one or more of the following formats:
  - a. The "MASTERFORMAT" 2011 Edition published by the Construction Specifications Institute.
  - b. The Standard Specifications for Road and Bridge Construction published by CDOT.
  - c. The alphanumeric system as published by the FAA.

B. Organization of Drawings and Specifications:

1. Organization of the specifications into divisions and sections, and arrangement or numbering of drawings is intended solely for the convenience of the Contractor in the Contractor's responsibilities to divide the Work among subcontractors or to establish the extent of work to be performed by any trade.
2. Neither the City nor the DEN Project Manager assume any liability arising out of jurisdictional issues or claims advanced by trade organizations or other interested parties based on the arrangement or organization of drawings or specifications.

C. Gender and Number:

1. For convenience and uniformity, parties to the Contract, including the City, Contractor, and DEN Project Manager, and their subcontractors, suppliers, installers, consultants or other interested parties are referred to throughout the Contract Documents as if masculine in gender and singular in number. Such reference is not intended to limit the meaning of the Contract Documents to the masculine gender or singular number.

D. Singular vs. Plural:

1. Materials, products, equipment, or other items of work referred to in the singular shall be construed as plural where applicable by the intent of the Contract Documents and shall not limit quantities to be provided by the Contractor.

E. Imperative Mood:

1. Specifications and notes on the drawings or elsewhere in the Contract Documents are generally written in the imperative mood as instructions to the Contractor, whether the Contractor is specifically addressed or not.

F. References to Subcontractors or Trades

1. References to subcontractors, trades or other entities, which are not parties to the Contract, shall be construed as meaning the Contractor whose responsibility it shall be to divide the Work among subcontractors or trades. Such references are used as a matter of convention, and are not intended to preclude or direct the Contractor's responsibility to divide the Work.

G. Abbreviations

1. A list of abbreviations used in the Contract Documents is included in Technical Specifications Section 014220 "Abbreviations and Symbols"; an abridged list of abbreviations used on the drawings is included with the drawings.
2. Abbreviations are believed to be those in general use in the construction industry. Contact the DEN Project Manager for clarification of abbreviations for which the meaning is not clear.

**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 **014230**

## **SECTION 014510 - CONTRACTOR QUALITY 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. This Section identifies the Quality Control activities to be performed during all phases of the Contract by the Contractor.
- B. The Contractor shall have in place a Quality Control Program as necessary to ensure that all materials and work are completed in compliance with Contract Documents. The Contractor is solely responsible for Quality Control and shall provide the necessary quality control personnel to assure that all materials, workmanship, and tests are in conformance with the Project documents with the exception of those tests and/or audits that may be conducted by the City as defined in the contract documents.
- C. Test schedules and/or testing requirements for materials used on this project are included in the technical specifications. Laboratory and field-testing identified in the specifications shall be conducted by a Testing Agency retained by the Contractor; hereafter is referred to as the Contractor Testing Agency (CTA).
- D. The City or its consultant working as the City agent will employ a testing agency to perform all the required Quality Assurance and Special Inspection Testing of material and Inspection of workmanship required by the Contract Documents and the Building Official to fulfill the code and the regulatory authority's requirements. The Contractor must schedule these tests and provide access to the City agents' inspectors and testers to perform these tests and inspections. The performance of the tests by the City does not relieve the Contractor of the responsibility to deliver a fully functional building meeting all the requirements of the Contract Documents and their intent. The Contractor must develop its own testing program for processing, acceptance from the subcontractor or suppliers at a frequency defined by the contractor for its own process control and to assure delivery of the intended acceptable workmanship. All time impacts of testing and retesting shall be accounted for in the updated schedule and any mitigation of time impacts shall be the responsibility of the Contractor.

#### **1.3 SUBMITTALS**

- A. Refer to Section 013300 "Submittals" and Section 013325 "Submittal Procedures" for submittal requirements.
- B. Quality Control Plan: Within ten (10) days after Notice to Proceed, the Contractor shall

submit a Quality Control Plan for review and acceptance. The Quality Control Plan shall be accepted by the DEN Project Manager prior to any Work or materials being incorporated into the Project. Acceptance by the DEN Project Manager does not relieve the Contractor of its responsibility to comply with the Contract Requirements. The Contractor Quality Control Plan shall address the following as a minimum:

1. A general description of Quality Control monitoring to be performed until final acceptance by DEN. Include monitoring activities of Work and the work site during times that no construction activity is scheduled to take place.
  - a. No work requiring QC inspection and testing shall take place without QC inspection and testing staff on site.
2. An individual designated by the Contractor and approved in writing by the DEN Project Manager whose [sole] responsibility is Quality Control Management. This individual shall be highly qualified in all phases of construction as it relates to this Project and shall have the authority to direct work changes required to bring the Work into conformance with Contract requirements, including stopping non-conforming work in progress. A detailed resume of the proposed Quality Control Manager including applicable education, experience, and certifications shall be included in the Quality Control Plan.
  - a. At the discretion of the DEN Project Manager, for Small Projects, Early Work Packages and Task Orders all of value less than \$1,000,000 or a duration which is less than three (3) months, the Contractor may assign one of the Contractor's staff, i.e. Contractor's Superintendent, Office Engineer, Field Engineer, or Contractor's Project Manager as Quality Control Manager. The assigned person must be on site while work requiring QC inspection and testing is being completed and available to discuss quality issues, manage all aspects of the Project Quality Control Plan, coordinate all required Special Inspection and Quality Assurance testing, and provide proposed solutions on all quality issues at any time as to not cause any delay to the project. Any delays caused in part or in all due to defective or no conforming work shall be borne by the Contractor.
3. Quality Control inspection staff as needed to assist the Quality Control Manager with implementation of the Quality Control Program. Duties of the Quality Control Inspectors shall be limited strictly to inspection of the ongoing work. Sampling and testing of materials shall be performed by Quality Control personnel other than Quality Control Inspectors. Quality Control Inspectors shall inspect only those work elements for which they are qualified. Resumes of the proposed Quality Control Inspectors including applicable education, experience and certifications shall be included in the Quality Control Plan.
4. An Organization Chart identifying all Quality Control staff by name and function. The chart shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work including tests performed by the CTA or DTA. If necessary, different Quality Control staff can be utilized for specific inspection and testing functions for different items of work. The chart shall show that the Quality Control Manager, Quality Control Inspectors, and Quality Control testing personnel are outside of



- the production staff with clear lines of authority for Quality Control.
5. The City and/or the City Program Management Team acting as the City agent will employ a DTA. The Contractor's testing and inspection shall be performed for the processing, preparation and to request City's inspection and as necessary to produce the required product as specified in the Contract Documents. The Contractor shall meet the minimum inspection and testing frequencies specified in the contract documents. When the contract documents do not specify minimum inspection and testing frequencies the Contractor shall propose in writing to the DEN Project Manager a QC inspection and testing frequencies that meet or exceed industry standards for the material and work being placed or conducted.
  6. Any test performed by any agency on the Project shall be recorded and show a passing re-test of all failing tests.
    - a. All test results shall be made available for inspection by the DEN Project Manager. This includes tests that are above the QC testing frequency required.
  7. Any tests submitted by the Contractor for basis of acceptance, or payment reduction when performed by the Contractor's agency, must meet all standards and must be certified to have followed approved procedure, processed in a certified lab by properly certified or licensed personnel by properly certified testers and on calibrated and certified equipment. Authentications of tests must be preapproved and cannot be selectively submitted. All tests shall be recorded in the field witnessed by DEN inspector to be accepted as a record test of the material in question. Any failing tests could be the sole basis for rejecting the material.
  8. Each technical specification division's requirements for quality control identifying each item requiring submittal and approval/acceptance prior to installation of work, all inspections to be performed during work and prior to acceptance of work, each item of work requiring testing by the independent testing agency or the City provided testing agency, and the testing frequency.
  9. The plan shall address all elements of special inspection required by the statement of special inspection as approved by the Building Official. All special inspections and tests will be performed by agencies employed by the City.
  10. The Contractor is responsible for the complete record of inspection file including but not limited to all manufacturer certificates, certificates of material compliance, Certificates of Material Testing Record, successful re-inspection of all deficiency items, proper deposition of design related Non-Conformance reports (NCR), Structural Engineers' observation reports, certification letters from the DTA, Building Inspectors' records of approvals, permit cards, fire suppression and fire-alarm tests records as witnessed by the authorities of jurisdiction and any record necessary to achieve a certificate of occupancy.
  11. The Contractor must keep track of all logs of discrepancies and submit periodic updates, as required by the DEN Project Manager, of all open issues and track the closure of open items in a timely manner.
  12. Establish controls and documentation format to ensure that items or materials that have been accepted through receiving inspection are used or installed. Identification and traceability shall be provided throughout all inspections, test activities, and records. For stored items, provisions shall be made for the control

- of item/material identification, consistent with the expected duration and type of storage.
13. A methodology of monitoring, testing, and exercising of all equipment, valves, and/or assemblies to ensure the Work installed is in proper working order.
  14. A list of suppliers and subcontractors. This list shall include items to be supplied by each supplier and/or subcontractor and shall identify work to be performed by each subcontractor. The list shall be updated and resubmitted as required.
  15. All approvals related to Special Inspection are subject to the acceptance or approval of the Building Official.
  16. Emergency contact information including name, company, title, work phone number, home phone number, and other means of contact. The Emergency Contact list shall include at least four individuals. The Emergency Contact list shall be maintained on a daily basis. In the event there is any change in any of the information, the Contractor shall forward the updated list to the DEN Project Manager and to DEN Maintenance Control (303-342-2800). The Emergency Contact list shall include the project number, project title, and date of issue.
- C. The Contractor shall transmit the following daily reports to the DEN Project Manager electronically PRIOR TO THE CLOSE OF BUSINESS ON the following work day:
1. CM-13 Contractors Daily Construction Report. The Foreman may add sheets of information to this form as needed.
  2. CM-07 Daily Quality Control Inspection Report and all CTA test results performed that day.
  3. CM-08 Daily DEN Time and Materials Report
- D. Deficiency List: The Quality Control Manager shall establish a deficiency list including the minimum information for each deficiency item; description, date, location, drawings reference, detail reference, specification reference, and superseding document NCR, date of expected solution date repaired date inspected by City representative and accepted.
- #### 1.4 DOCUMENTATION
- A. The Contractor shall not change or alter approved submittals, procedures, specifications, drawings/MODELS, or other pertinent documentation without the DEN Project Manager's written authorization.
- B. All records and documents that are quality related shall be prepared, identified and maintained by the Contractor and shall be made available to DEN upon request. Records shall be protected from damage, deterioration, or loss. A copy of the records and documents shall be maintained at the Work site at all times unless the DEN Project Manager has approved other locations in writing. Retention time for all quality records shall be not less than three (3) years from date of Final Acceptance of the Contract.
- C. The Contractor is responsible for the complete record of inspection file including but not limited to all manufacturer certificates, certificates of material compliance, Certificates of Material Testing Record, successful re-inspection of all deficiency items,

proper deposition of design related NCRs, Structural Engineers' observation reports, certification letters from the DTAs, Building Inspectors' records of approvals, permit cards, fire suppression and fire-alarm tests records as witnessed by the authorities of jurisdiction and any record necessary to achieve a Certificate of Occupancy.

- D. The Contractor shall maintain records at the actual worksite and at Contractor's office to show the inspection status of materials and items installed in order to ensure that the required inspections and tests have been performed in a timely and correct manner.
- E. The Contractor must keep a record of all deficiency issues and show positive evidence of closure (passing re-inspection or re-test) to every issue.

## 1.5 INSPECTIONS AND TESTS

- A. Inspections, tests and system shut down requests, conducted by persons or agencies other than the Contractor, shall not in any way relieve the Contractor of the responsibility and obligation to meet all specifications and the referenced standards. The Contractor's designated Quality Control Representative shall inspect the work and shall ensure the Work complies with the Contract requirements prior to any requests for inspection or testing.
- B. When the specifications, laws, ordinances, rules, regulations or orders of any public agency having jurisdiction require the DEN Project Manager's surveillance of inspections or tests, the Contractor shall notify the DEN Project Manager, in writing, of the place, date and time 48 hours prior to the inspection and/or test. The Contractor shall be responsible for notifying and requesting inspection by other agencies including but not limited to the Denver Building Inspection Division, Denver Fire Department, and Denver Water Department. Prior to request for other agency inspections, the Contractor shall meet and plan inspection times with the DEN Project Manager.
- C. Special inspections or tests may be required by the technical specifications, City, State and/or Federal Agencies in addition to those tests already performed. The Contractor shall notify the DEN Project Manager, in writing, at least 48 hours in advance of the additional inspections or tests.
- D. Quantities will be verified as defined in the Pre-Work Meetings.

## 1.6 INSPECTION PLAN

- A. The Contractor shall utilize the following six-point inspection plan to ensure the conformance of the Work performed by the Contractor meets the requirements of the Contract Drawings and specifications, the referenced codes and standards and the approved submittals:
  - 1. Pework Coordination: Prior to the start of construction work on the Contract and prior to the start of Work under each separate specification section and prior to the start of Work where a change in a construction operation is contemplated by

the Contractor, and prior to a new subcontractor starting work, a coordination meeting to ensure that the Contractor's personnel have no misunderstandings regarding their safety and quality procedures as well as the technical requirements of the Contract will be held with the Contractor's superintendent, Quality Control and Safety representatives, and DEN Project Manager. Supervisory, Safety and Quality Control, representatives of all applicable subcontractors will also attend. Prior to the meeting, the Contractor's Quality Control Manager shall provide the DEN Project Manager with a meeting agenda for review. The Contractor's Quality Control Manager shall conduct the meeting and distribute the approved agenda. The Quality Control Manager shall develop and electronically distribute finalized meeting minutes within one business day upon completion of the meeting. The following items shall be presented and reviewed by the Contractor:

- a. Contract requirements and specifications.
  - b. Shop drawings, certifications, submittals, models, and as-built drawings.
  - c. Testing and inspection program and procedures.
  - d. Contractor's Quality Control program.
  - e. Familiarity and proficiency of the Contractor's and subcontractor's workforce to perform the operation to required workmanship standards including certifications of installers.
  - f. Safety, security, and environmental precautions to be observed.
  - g. Any other preparatory steps dependent upon the particular operation.
  - h. The Contractor's means and methods for performing the Work.
2. Initial Inspection: Upon completion of a representative sample of a given feature of the Work and no later than two weeks after the start of a new or changed operation, the DEN Project Manager and/or the DEN Project Manager's designated representatives will meet with the Contractor's Quality Control representative and applicable subcontractor's supervisor and their Quality Control representatives to check the following items, as a minimum:
- a. Workmanship to established quality standards.
  - b. Conformance to Contract Drawings, specifications and the accepted shop drawings.
  - c. Adequacy of materials and articles utilized.
  - d. Results of inspection and testing methods.
  - e. Adequacy of as-built drawings/MODELS maintained daily.
  - f. Once accepted, the representative sample will become the physical baseline by which ongoing work is compared for quality and acceptability. To the maximum practical extent, approved representative samples of work elements shall remain visible until all work in the appropriate category is complete. Acceptance of a sample does not waive or alter any Contract requirements or show acceptance of any deviation from the Contract not approved in writing by the DEN Project Manager.
3. Follow-up Inspection: The Contractor's Quality Control representative will monitor the Work to review the continuing conformance of the Work to the workmanship standards established during the preparatory and initial inspections.
4. Completion Inspection: Forty-eight (48) hours prior to the completion of an item

or segment of work and prior to covering up any work, the Contractor shall notify the DEN Project Manager, in writing, who will verify that the segment of work is substantially complete, all inspections and tests have been completed and the results are acceptable. The purpose of this inspection is to allow further corrective work upon, or integral to, the completed segment of work. THIS IS NOT AN ACCEPTANCE INSPECTION. If any items are determined to be deficient, need correction or are non-conforming, a Deficiency List will be prepared and issued to the respective Contractor for correction, repair, or replacement of any deficient or non-conforming items. The DEN Project Manager and Contractor's Quality Control representative will verify the correction of the deficient and/or non-conforming items prior to the start of the next operation.

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

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

- A. Refer to Section 014525 - Material Testing Agency

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

## **PART 3 - EXECUTION**

### **3.1 REQUIREMENTS**

- A. All materials required for the Contract shall be new except where specified otherwise. The DEN Project Manager may elect to perform additional inspections and/or tests at the place of the manufacture, the shipping point or at the destination to verify conformance to applicable specifications. Inspections and tests performed by DEN shall not relieve the Contractor from the responsibility to meet the specifications, nor shall such inspections/tests be considered a guarantee for acceptance of materials that will be delivered at a later time.
- B. Materials accepted based on a Certificate of Compliance may be sampled and inspected/tested by DEN or its designer at any time. The fact that the materials were accepted based on such certification shall not relieve the Contractor of the responsibility to use materials that conform to the specifications.
- C. The Contractor shall impose upon suppliers the same quality control requirements, including inspection and test procedures, as imposed upon him by the specifications and referenced standards. The Contractor shall apply appropriate controls, designed to ensure that all materials supplied meet the requirements and specifications.

## **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. Refer to Article 1706 - Removal of Defective Materials and Work in the General Contract Conditions, 2011 Edition.

**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. Where the Specifications reference the CDOT Standard Specifications for Road and Bridge Construction, the references shall also mean CDOT Field Materials Manual for schedule of tests unless otherwise stated. As a minimum, the CTA described in this Section shall perform all applicable tests listed in the manual including the independent assurance sampling and testing. In the event of such a conflict between the schedule and a specification in these technical provisions, the more comprehensive testing shall govern unless otherwise noted.
- 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 submittals shall comply with requirements of Sections 013300 "Submittal

Procedures" and 013325 "Shop and Working Drawings, Product Data and Samples" for submittal requirements.

#### 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 Contractor to the DEN Project Manager 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. 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 Inspector



immediately at the test site. Any failing test shall be reported separately to the DEN Inspector or DEN Project Manager. The draft test results shall also be attached to the Daily Quality Control Inspection Report (reference Section 014510 "Contractor Quality Control") and transmitted to the DEN Project Manager the next workday.

- C. Typed test reports shall be provided to the DEN Project Manager as specified in the "Weekly Reports" Article in this Section. 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.
- 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 Quality Control Manager shall prepare and submit to the DEN Project

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

- B. The weekly report shall be submitted per Sections 013000 and 013350 requirements.

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

## **PART 3 - EXECUTION**

### **3.1 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 CTA or its personnel are not effectively enforcing or performing the testing and documentation requirements specified in the Contract, the DEN Project Manager will require, in writing, the Contractor to 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 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.
- B. Section 012910 "Schedule of Values"

#### **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**

- A. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- B. Submit a Mobilization Schedule a minimum of fourteen (14) days prior to first billing for mobilization.

#### **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.

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### **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**

#### 4.1 METHOD OF MEASUREMENT

- A. Refer to Section 013210 - Schedule, for details regarding mobilization scheduling, billing, and payment.

### **PART 5 - PAYMENT**

#### 5.1 METHOD OF PAYMENT

- A. Refer to Article 1104 - Changes in the Work, Contract Price or Contract Time of the General Contract Conditions, 2011 Edition.

END OF SECTION **015050**

## SECTION 015210 - TEMPORARY FACILITIES

### 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 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.
  - 3. Section 321216 "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
  - 4. Section 321313 "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

#### 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 located as shown on the Contract Drawings and/or as designated by the DEN Project Manager. All construction offices, staging areas, and material storage areas are to occur within these areas.
  - 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 Drawings or as specified in the Contract Special Conditions.
  10. Contractor Field Office:
    - a. The Contractor shall acquire all necessary permits for installation and construction work related to the Contractor's field office and fencing.
    - b. The Contractor shall provide, as part of the Contractor's on-site field office, a conference room for weekly meetings. Minimum size to accommodate **[fifteen (15)]** people with the currently approved schedule posted on a wall. The conference room shall have **[network connection with a monitor]** and **[one (1)]** available telephone.
    - c. Jack the mobile office unit off its wheels and provide support. Enclose the underside of the trailer with weatherproof skirting.
    - d. Install tie downs in compliance with all applicable codes.
    - e. Provide access to the field office and easily accessible space for parking **[six (6)]** full size passenger automobiles as a minimum. Grade the field office site, access roadway, and parking area for drainage, and surface with gravel paving or crushed stone.
    - f. Water and sewer lines to the field office, if installed, shall be installed so they will not freeze.
  11. 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.
  12. 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.
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. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- B. Submit a shop drawing within five (5) days of the Notice to Proceed that shows the following:
  1. Temporary facilities equipment and materials (include manufacturer's literature).
  2. Details and layout of temporary installations including fences, roads, parking, buildings, storage areas, signage, and drainage plans.
  3. Lighting plan showing temporary lighting facilities, electrical service panel location, electrical circuit diagram, and anticipated light level on the working roadway, pathway, or construction surface.
  4. As-built description of any temporary underground utilities referenced to the Airport grid and benchmark system within five (5) days of completion of the installation.
  5. Copies of all permits for all temporary facilities.

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

- 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 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 Article 805 – Protection of Street and Road System in the General Contract Conditions, 2011 Edition.

#### 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. Refer to Technical Specifications Sections 013300 "Submittals" and 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- B. Submit a Traffic Control Plan (TCP) 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.
  3. A Method of Handling Traffic (MHT) must be submitted and approved by the DEN Project Manager, which at a minimum will show and describe proposed location, dates, hours, and duration of detours, vehicular traffic routing, and management, traffic control devices for implementing detours and details of barricades.
- C. Submit Haul Route Plan for both on- and off-site hauls. The Haul Route Plan shall be submitted 30 days prior to hauling any permanent material. The Plan shall be updated as the Contractor's plans change.
- D. 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.
- E. Shutdown requests for any impact to traffic must be submitted for approval a minimum of five days before the intended shutdown. These requests will be made through the DEN Project Manager.

## **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. Refer to Title 8 - Protection of Persons and Property, Section 801.1 in the General Contract Conditions, 2011 Edition.

### 3.6 SIGNS

- A. Refer to Title 8, Article 802 - Protective Devices and Safety Precautions in the General Contract Conditions, 2011 Edition.
  - 1. The Contractor must contact the DEN Project Manager a minimum of five (5) working days in advance of construction for installation, relocation, or removal of regulatory parking signs.
- 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. Title 8 - Protection of Persons and Property in the General Contract Conditions, 2011 Edition, specifically the following articles:
  - 1. Article 806 - Protection of Drainage Ways
  - 2. Article 807 - Protection of Environment
  - 3. Article 808 - Hazardous and Explosive Materials or Substances
  - 4. Article 809 - Archaeological and Historical Discoveries
- C. Denver Municipal Airport System Rules and Regulations, Part 180-Environmental Management.
- D. DEN Environmental Management System (EMS)

#### **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 permittee, and all inspection requirements have been satisfied in accordance with State and local permitting requirements.

#### **1.3 SUBMITTALS**

- A. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- 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. The Contractor shall be responsible for payment of all fees associated with review of environmental permit applications and processing of environmental permits.

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.

#### 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, 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.

**END OF SECTION 015810**

## 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.
- B. Related Requirements:
  - 1. Section 012300 "Alternates" for products selected under an alternate.
  - 2. Section 012510 "Substitutions" for requests for substitutions.
  - 3. Section 014225 "Reference Standards" for applicable industry standards for products specified.

#### 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 submittal 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. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number, title, and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  2. DEN Project manager's Action: If necessary, DEN Project Manager will request additional information or documentation for evaluation within one week of receipt of a comparable product request. DEN Project Manager will notify Contractor of approval or rejection of proposed comparable product request within [14] days of receipt of request, or [seven (7)] days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if DEN Project Manager does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  2. If a dispute arises between contractors over concurrently selectable but incompatible products, DEN Project Manager will determine which products shall be used.

#### 1.6 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.

## 1.7 PRODUCT WARRANTIES

- A. Refer to Title 18 - Warranties, Guarantees and Corrective Work of the General Contract Conditions, 2011 Edition.
- B. Submittal Time: Comply with requirements in Section 017720 "Contract Closeout."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- 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. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," DEN Project Manager will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

6. 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. Comparable products or substitutions for Contractor's convenience will not be considered.
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 not be considered.
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 not] be considered [unless otherwise indicated].
  - b. Nonrestricted 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 not be considered [unless otherwise indicated].
  - b. Nonrestricted 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.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Matching Specification: Where Specifications require "match DEN Project Manager's sample", provide a product that complies with requirements and matches DEN Project Manager's sample. DEN Project Manager's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012510 "Substitutions" for proposal of product.

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by DEN Project Manager from manufacturer's full range" or similar phrase, select a product that complies with requirements. DEN Project Manager will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 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. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

## 2.3 MATERIALS

- A. General: Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Section 018113.13 "Sustainable Design Requirements - LEED for New Construction and Major Renovations," Section 018113.16 "Sustainable Design Requirements - LEED for Commercial Interiors," Section 018113.19 "Sustainable Design Requirements - LEED for Core and Shell Development."
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to DEN Project Manager for the visual and functional performance of in-place materials.

**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, 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 providing storage and protection of the materials, products and supplies which are to be incorporated into the construction and indicating such storage areas on the working drawings with the location and dates when such areas will be available for each purpose.
- B. Related Requirements:
  - 1. Section 015210 "Temporary Facilities" for requirements for temporary facilities.

#### **1.3 SUBMITTALS**

- A. Refer to Technical Specifications Sections 013300 "Submittal Procedures" and 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures. Submit concurrently with submittals required in Section 013223 "Construction Layout, As-built and Quantity Surveys".
- B. Submit working drawings showing locations of storage areas not indicated on the Contract Drawings.
- C. Submit descriptions of proposed methods and locations for storing and protecting products.

### **PART 2 - PRODUCTS**

#### **2.1 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 and the City. Storage facilities 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

### 5.1 METHOD OF PAYMENT

- A. The cost of the Work described in this Section shall be included in the applicable unit

price item, work order, or lump sum bid item.

- B. Reference Section 012910 "Schedule of Values" for additional requirements for the possible payment of stored material.

END OF SECTION 016610

## SECTION 017330 - CUTTING AND PATCHING

### PART 1 - GENERAL

- A. RELATED DOCUMENTS
- B. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.
- C. Refer to Article 316, Cutting and Patching the Work in the General Contract Conditions, 2011 Edition

#### 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.
- C. Alternates: Refer to Division 01 Section 012300 "Alternates" for description of Work in this Section affected by Alternates.

### 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. Refer to Section 013300 "Submittal Procedures" and Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
- B. Cutting and Patching Proposal: Submit a proposal describing procedures at least thirty (30) calendar days before the time cutting and patching will be performed, requesting approval to proceed. Obtain approval of cutting and patching proposal by DEN Project Manager before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work. The proposal 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. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
  - 4. 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.
  - 5. 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.
  - 6. Effect on the work and other surrounding work or on structural or weatherproof integrity of Project.
  - 7. Written concurrence of each contractor or entity whose work will be affected.
  - 8. Cost proposal, when applicable.

## 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 in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would reduce, in DEN's sole opinion, the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactorily manner.
1. If possible, retain the original installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized, experienced, and specialized firm as approved by the DEN Project Manager. 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.

- D. Cutting and Patching Conference: Before proceeding, meet at the Project site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch and repair materials and surfaces cut or damaged during cutting and patching operations by methods and with materials so as not to void existing warranties.

1. All effort shall be made to engage the original installer or fabricator to patch the exposed Work listed below that is damaged during selective demolition. If it is impossible to engage the original installer or fabricator, engage another recognized, experienced and specialized firm as approved by the DEN Project Manager:

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

## 1.7 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: Use materials identical to existing materials. For exposed surfaces, use materials that visually and texturally match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials as approved by the DEN Project Manager.



## **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 and inspected by the DEN Project Manager.

### **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 a minimum of x-rays or ground penetrating radar (GPR) at each location planned for core drilling prior to submittal to the DEN Project Manager and to utility representatives for approval for core drilling. The request for approval shall be submitted a minimum seven (7) days before Core Drilling. 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. Core drilled “cores” and the core-drilled opening shall be inspected by DEN Project Manager Representatives prior to installation of any systems in new openings.
- C. 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.
- D. X-ray activities may not be performed during hours of activity or occupancy in the area of the x-ray system. The Contractor shall provide all manpower and barriers required

to secure the areas affected by x-ray activities.

#### **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, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

#### 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 013300 "Submittal Procedures" for submittal procedures.
  - 2. Section 013325 "Shop and Working Drawings, Product Data and Samples" for submittal procedures.
  - 3. Section 015719 "Temporary Environmental Controls" for environmental control procedures.
  - 4. Section 018113 "Sustainable LEED Requirements" for LEED requirements.
  - 5. Section 024116 "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements[, and for disposition of hazardous waste].
  - 6. 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].
  - 7. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.
  - 8. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

#### 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.

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

#### 1.4 SUBMITTALS

A. The Contractor shall submit a list of materials and products used with Safety Data Sheets (SDS). Examples include chemicals, solvents, fuels, building materials, etc.

1. A hardcopy or electronic link to the SDS for all materials and products used, if applicable.
2. Identify storage methods for materials, including measures to segregate incompatible materials.

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. A hardcopy or electronic link to SDSs for all materials and products used.
  - B. Identify storage methods, including measures to segregate incompatible materials.
  - C. 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, 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 maintaining a clean, orderly, hazard free work site during construction, and final cleaning for the City's Final Acceptance. Failure to maintain the work site will be grounds for withholding monthly payments until corrected to the satisfaction of the DEN Project Manager.
- B. Refer to Article 325, Cleanup During Construction in the General Contract Conditions, 2011 Edition

#### 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 by other City contractors as required and to allow access by emergency personnel.

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 DEN 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 every shift/workday 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. All hard concrete, steel, wood, and finished walking surfaces shall be swept clean daily.
- B. Remove or secure loose material on open decks and on other exposed surfaces at the end of each workday or more often in a manner that will maintain the 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. Refer to Article, Clean-up Upon Completion in the General Contract Conditions, 2011 Edition. Additionally, 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 017720 - CONTRACT CLOSEOUT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. Work specified in this Section includes procedures required prior to Final Acceptance of the Work in addition to those specified in Title 20 – Final Completion and Acceptance of The Work in the General Contract Conditions, 2011 Edition, and Technical Specification Section 017840 "Contract Record Documents".
- 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. Form CM-75, Closeout Checklist
- D. SUBMITTALS
  - 1. Submit written Certification to the DEN Project Manager that, in the opinion of the Contractor, the Work is complete.
  - 2. Submit final survey within 60 days after issuance of Substantial Completion.
  - 3. Submit a Final Statement of Accounting to the DEN Project Manager.

### **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 Contractor shall submit written certification to the DEN Project Manager when, in the opinion of the Contractor, 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 City.
  4. All as-built documents have been submitted and accepted.
  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 have been returned to DEN Airport Security.
- B. The DEN Project Manager will inspect the Work in accordance with the Section 2002.1 of the City and County of Denver's Department of Aviation's General Contract Conditions.
- C. If the DEN Project Manager finds incomplete or defective Work:
1. The DEN Project Manager may, at the DEN Project Manager's sole discretion, either terminate the inspection, or prepare a punchlist and notify the Contractor in writing, listing the incomplete or defective Work.
  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.

### 3.3 REINSPECTION FEES

- A. Should the DEN Project Manager be required to perform re-inspections of the Work due to the Contractor prematurely claiming the status of the Work to be complete:
1. The Contractor shall compensate the City for such additional services at the rate of \$125.00 per man-hour, with a minimum charge of \$250.00.
  2. The City shall deduct the amount of such compensation from the final payment to the Contractor.

### 3.4 FINAL SURVEY FEES

- A. The Contractor shall complete and submit the final survey within 60 days after issuance of Substantial Completion. If the Contractor fails to complete and submit the final survey within this time frame it is understood that DEN will arrange for a qualified

surveying company to complete this work at the Contractor's expense. All costs associated with DEN arranging for and completing the final survey will be deducted from the final payment including compensation due the City for the DEN Project Manager's time to manage this work.

1. The DEN Project Manager's rate of compensation shall be set at \$150.00 per man-hour.
2. Survey submittals needing to be revised may extend the 60-day time frame at the DEN Project Manager's discretion.
3. Costs, including the DEN Project Manager's, for the review of the resubmitted survey shall be deducted from the final payment.

### 3.5 LATE CLOSEOUT FEES

- A. Within 100 days after issuance of substantial completion, all documentation required by this Contract to achieve Project Closeout shall be submitted. Failure to submit all required documentation shall result in fees to compensate the City for project management work while the project remains open.
  1. Fees at the rate of \$450 per day.
  2. The resubmittal of required documents may extend the 100-day time frame at the DEN Project Manager's discretion.

### 3.6 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a Final Statement of Accounting to the DEN Project Manager.
- B. The Final Statement of Accounting shall reflect all adjustments to the Contract amount and shall include the following:
  1. The original Contract Value.
  2. Additions and deductions resulting from the following:
    - a. Approved Change Orders.
    - b. Allowances.
    - c. Final quantities for unit price items, including required backup for the quantities.
    - d. Deductions for corrected work.
    - e. Penalties.
    - f. Deductions for liquidated damages.
    - g. Deductions for re-inspection payments.
    - h. Other adjustments.
  3. Total Contract Value, as adjusted.
  4. Previous payments.
  5. Sum remaining due.
- C. If required, the DEN Project Manager will prepare a final Change Order, reflecting the approved adjustments to the Contract Value that were not included in previously

issued Change Orders.

### 3.7 FINAL APPLICATION FOR PAYMENT

- A. The Contractor shall submit the final application for payment in accordance with the procedures and requirements detailed in Article 2003, Final Settlement in the General Contract Conditions, 2011 Edition.

## **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 017835 - WARRANTIES AND BONDS

### 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 preparing and submitting warranties and bonds required by the Contract and these Specifications.

#### 1.3 SUBMITTALS

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

- 1. All warranties shall be executed specifically to the City.
- 2. Photocopies or reproductions of stock manufacturer's warranties will not be accepted, although electronic copies are acceptable when the manufacturer's warranty is contained in the O&M manual.

- B. Submit samples of warranties and bonds for review by the City prior to execution of Work. Do not submit final warranties until sample warranties have been approved by the City.

- 1. Submit the warranties and bonds required by the Contract Documents.
- 2. Prepare and submit a list of all warranties and bonds on the following forms:

- a. CM-10: Contractor Warranty
- b. CM-11: Contractor/Sub-Contractor Warranty

- C. Submit executed warranties and bonds

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### 3.1 WARRANTIES AND BONDS

- A. Submit executed warranties and bonds required by the Contract Documents, as detailed in Title 15 - Performance and Payment Bonds and Title 18 - Warranties, Guarantees, and Corrective Work in the General Contract Conditions, 2011 Edition.

1. Prepare and submit a list of all warranties and bonds on the following forms:
  - a. CM-10, Contractor Warranty
  - b. CM-11, Contractor/Sub-Contractor Warranty

## **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 017835

## SECTION 017840 - CONTRACT RECORD DOCUMENTS

### 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 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. Section 013100 "Project Management and Coordination".
  - 2. Section 013223 "Construction Layout, As-built and Quantity Surveys".
  - 3. Section 013300 "Submittal Procedures".
  - 4. Section 013325 "Shop and Working Drawings, Product Data and Samples".
  - 5. Section 017720 "Contract Closeout".
  - 6. Section 017825 "Operation and Maintenance Data".

#### 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. At the completion of this Contract, deliver all record documents including the following:
  - 1. As-built shop drawings, diagrams, illustrations, schedules, charts, brochures and other similar data.
  - 2. Warranties, guarantees, and bonds.
  - 3. Contract Documents.
  - 4. Contractor records.

- C. As-built Contract Drawings shall be submitted with each monthly progress payment application, and a complete set shall be submitted prior to final payment.
1. The Contractor shall provide a single electronic copy of each Contract drawing sheet which has been used to produce work during the payment period or work that payment is being requested on, which records the current as-built conditions of work, including the posting of any change orders or change directives not shown on the Contract Documents at the time of Contract signing.
    - a. The Contractor must show as-built work completed through the payment application date 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. The Contractor shall be liable for any costs incurred by the City or a third party due to errors or lack of information provided on the as-built drawings.
    - c. All markings on drawings shall be legible to identify the portion of work completed.
    - d. 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.

#### 1.4 QUALITY CONTROL

- A. Submit electronically scanned copies of all documents required by Chapter 17 “Special Inspection and Testing” of the International Building Code 2009 as amended by City and County of Denver 2011. Keep scale and clarify dimension where electronic copies are not as originally scaled and dimensioned.
- B. For projects utilizing BIM for Revit, follow approved BIM execution plan and DEN BIM DSM for record documents, formats, and quality control and assurance procedures.

### **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 Contractor shall maintain 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 at the field office one copy of the following record documents:

1. Contract Documents:

- a. Contract Drawings with all clarifications, requests for information, directives, changes, and as-built conditions clearly posted.
- b. Contract Specifications with all clarifications, requests for information, changes, directives and record of manufacturer actually used along with product trade name.
- c. Reference Standards in accordance with Section 014225 "Referenced Standards".
- d. Affirmative Action Plan and documents.
- e. One (1) set of drawings to record the following:
  - 1) Horizontal and vertical location of underground utilities affected by the Work.
  - 2) Location of internal utilities; include valves, controls, conduit, duct work, switches, pressure reducers, size reducers, transitions, crosses, tees, filters, motors, heaters, dampers, regulators, safety devices, sensors, access doors and appurtenances that are concealed in the construction shall be shown with dimensions given from a visible and recognizable reference to the item being located in all three dimensions. The drawings shall also reference the applicable submittal for the item being located.
  - 3) Field changes of dimensions and details including as-built elevations and location (station and offset).
  - 4) Details not on original Contract Drawings but obtained through requests for information or by other communications with the City.

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. Label each document page or article "PROJECT RECORD" in two-inch high letters.
- B. Keep record documents current daily.
- C. Legibly mark copies of the Contract Drawings to record actual construction.

- D. Legibly mark up each Section of the specifications and Contract Drawings to record:
1. Manufacturer, trade name, catalog number and supplier of each product and item actually installed
  2. 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.

### 3.4 MONTHLY REVIEW

- A. Prior to any application for payment, the DEN Project Manager or the DEN Project Manager's designated representative will inspect the record documents to ensure that they are being maintained and contain the most current correct data with particular attention to as-built drawings.
- B. If, during the inspection, the DEN Project Manager determines that the documents are not being maintained and kept current as to as-built conditions, an amount may be withheld from the payment request and deducted from the Contract value to cover the City's cost of collecting and recording the as-built Contract data. This cost will be determined based on \$100.00 per man-hour of effort.

## 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

