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Design Professional: **Enter Design Professional’s Name**  
 Contact Name  
 Address  
 City, State Zip  
 806.999.9999/Fax 999.999-9999 |

Sr. Program Director: **Texas Tech University System**  
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**DIVISION 00: PROCUREMENT AND CONTRACT REQUIREMENTS**

<u>DIVISION</u>	<u>DESCRIPTION</u>
Specifications	[Construction Manager’s] Supplemental Specifications
HUB Program	Historically Underutilized Business Participation for Contracts over \$1,000,000.00
00 52 36	[Construction Manager’s] Subcontractor Agreement - SAMPLE
00 54 10	Tax Exemption Certificate
00 73 36	Equal Opportunity Clause
00 72 00	Uniform General Conditions and Supplementary General Conditions
CM Buyout	[Construction Manager’s] Proposed Buyout Schedule
00 43 43	Area Wage Rates Summary
00 45 26	Workers' Compensation Insurance

**DIVISION 01: GENERAL REQUIREMENTS**

<u>DIVISION</u>	<u>DESCRIPTION</u>
01 01 00	Special Conditions
01 21 00	Allowances
01 25 00	Substitution Request Procedures
01 29 00	Payment Procedures
01 31 00	Project Management and Coordination
01 32 00	Construction Progress Documentation
01 33 00	Submittals
01 40 00	Quality Requirements
01 42 00	Reference Standards
01 50 00	Temporary Facilities and Controls
01 56 39	Temporary Tree and Plant Protection
01 58 13	Construction Project Signage
01 58 13A	Construction Project Signage Template
01 60 00	Product Requirements
01 77 00	Closeout Requirements
01 78 23	Operations and Maintenance Data
01 78 39	Project Record Documents
01 79 00	Demonstration and Training
01 91 13	Project Commissioning Requirements
OPs	TTUS Component Institution’s Operating Policies and Procedures

**END OF SECTION**

**SECTION 01 01 00 SPECIAL CONDITIONS****PART 1. GENERAL**

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.

## 1.2 LOCATION AND SCOPE OF THE PROJECT

- A. The project is located at [Component Institution, City], Texas.
- B. This project includes landscaping the space previously occupied by the [Building/Institution].

## 1.3 RELATED REQUIREMENTS

- A. Instructions to Proposers.
- B. Agreement Forms
- C. General Conditions

## 1.4 EQUAL OPPORTUNITY CLAUSE

- A. Attention is called to the Equal Opportunity Clause applicable to this project and included in the Specifications.

## 1.5 EXAMINATION OF FIELD CONDITIONS

- A. The Contractor shall take field measurements and verify field conditions and shall carefully compare these field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing work. Errors, inconsistencies, or omissions discovered shall be reported to the Design Professional before proceeding with the work.

## 1.6 ADDENDA

- A. Any addenda issued in writing by the Design Professional prior to the proposal closing time shall be covered by the proposal. In closing the Contract such addenda will become a part thereof and modify these Specifications and/or the Drawings accordingly. Verbal changes in the work as shown or described, will not be binding

## 1.7 START OF WORK

- A. The contractor will commence work on or after a date specified in a written "Notice to Proceed" by the Institution.

## 1.8 COORDINATION

- A. All contractors and subcontractors on the project shall coordinate their work with each other, advising on work schedules, equipment locations, etc.

## 1.9 DRAWINGS AND SPECIFICATIONS

- A. The drawings and specifications are intended to describe and provide for a finished and complete piece of work, and all work must meet the requirements of all the applicable and governing laws, ordinances, rules, and regulations of the locality.

- B. No extra compensation will be allowed for oversight of any such requirements, except by written order issued by Texas Tech.
- C. Should any doubt arise regarding Drawings or Specifications, clarification shall be requested of Texas Tech's Representative or the Design Professional. Failure to do so will not relieve the Contractor from the responsibility to complete the work to Texas Tech's satisfaction.

#### 1.10 MEASUREMENTS

- A. Before ordering any material or doing any work, the Contractor shall verify all measurements of the work and shall be responsible for the correctness of same; any difference which may be found shall be submitted to the Design Professional for consideration before proceeding with the work.

#### 1.11 PROTECTION OF EXISTING FACILITIES

- A. The Contractor shall take precautions to protect existing facilities and features within the designated construction limits and along the access to the construction site.
- B. After materials, equipment and machinery are installed, properly protect all work until the several portions thereof are accepted.
- C. Any damage from whatever cause shall be made good by the Contractor without cost to the Institution, whether the repair is made with the Contractor's own materials and labor or by others under the Contractor's directions.

#### 1.12 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the proposal closing date, except when a specific date is specified.
- C. Obtain copies of standards when required by Contract Documents. Maintain a copy at job site during progress of the specific work.

#### 1.13 MANUFACTURER'S DIRECTIONS

- A. All manufacturer's articles, materials and equipment shall be applied, installed, connected, erected, secured, used, cleaned, and put in operation as recommended, directed, or specified by the manufacturer, for the type of installation called for.

#### 1.14 ITEMS SPECIFIED BY TRADE NAME

- A. Reference to items by specific trade name is made as a basis of quality and function. Equivalent items may be used instead; however, the right to determine such quality shall remain with the Institution's representative. The terms "similar to", "or equal" or similar phrases shall be interpreted similarly.

#### 1.15 SUBSTITUTIONS

- A. Substitutions of any materials other than those specifically called for shall be submitted to the Design Professional and Texas Tech for approval.

#### 1.16 SAFETY REQUIREMENT

- A. Store volatile waste in covered metal containers and remove it from the premises daily.
- B. Prevent the accumulation of waste which creates hazardous conditions.

- C. Provide adequate ventilation during the use of volatile or noxious substances.
- D. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws.
- E. Do not burn or bury rubbish and waste materials on the Project site.
- F. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

#### 1.17 REPAIR OF DAMAGE

- A. The Contractor shall be responsible for any loss or damage caused contractor's workmen or subcontractors to the work or materials, to tools and the equipment of one another, to adjacent property and persons, and shall make good any loss, damage, or injury without cost to Texas Tech.

#### 1.18 CLEANING

- A. The Contractor shall promptly remove from the building, lot, sidewalks, and streets all rubbish and dirt due to the work done under this contract. At the completion of work, completely clean the areas in which work has been done, including glass, and leave the building thoroughly cleaned and ready for occupancy. All construction debris shall be removed.

#### 1.19 REMOVAL OF DEBRIS

- A. The Contractor shall remove from the Campus and dispose of all unused materials and debris created by the construction process for the Project. The Contractor is to keep the streets and construction area free of rubbish and debris. Grass and weeds within the construction fence are to be kept mowed. The site shall comply with the City Code and Environmental Safety regulations. The Contractor shall broom the streets during the excavation and filling process so that all spillage is removed as the work progresses.

#### 1.20 WRITTEN GUARANTEE

- A. In addition to the requirements of the Uniform General Conditions and Supplementary General Conditions, the Contractor shall submit to Texas Tech a Written Guarantee, prior to release of final payment, on a form approved by the Design Professional and Texas Tech for the work, materials, and equipment for a one-year period.

#### 1.21 DELAYS AND EXTENSION OF TIME

- A. In addition to the provisions of Article XXIV, paragraph 24.3 of the Uniform General Conditions and Supplementary General Conditions, the following provisions shall apply:
  1. In reference to Article XXIV, paragraph 24.3, the number of weather days for the following months shall be considered normal weather days for [select city], Texas. No time extension for weather delays will be given unless the number indicated is exceeded.

#### MAIN CAMPUSES

##### **TTUHSC El Paso - El Paso, Tx**

January	2 days	July	4 days
February	2 days	August	4 days
March	2 days	September	3 days
April	2 days	October	2 days
May	2 days	November	2 days
June	2 days	December	2 days

##### **TTU / TTUHSC - Lubbock, Tx**

January	2 days	July	4 days
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February	2 days	August	4 days
March	3 days	September	5 days
April	4 days	October	4 days
May	6 days	November	3 days
June	6 days	December	3 days

**ASU - San Angelo, Tx**

January	2 days	July	4 days
February	3 days	August	4 days
March	4 days	September	6 days
April	4 days	October	5 days
May	6 days	November	3 days
June	6 days	December	2 days

**MSU - Wichita Falls, Tx**

January	3 days	July	4 days
February	4 days	August	5 days
March	5 days	September	6 days
April	6 days	October	6 days
May	9 days	November	4 days
June	8 days	December	4 days

**EXTENDED CAMPUSES****TTUHSC - Abilene, Tx**

January	3 days	July	4 days
February	4 days	August	5 days
March	4 days	September	6 days
April	5 days	October	6 days
May	7 days	November	4 days
June	7 days	December	3 days

**TTU / TTUHSC - Amarillo, Tx**

January	2 days	July	5 days
February	2 days	August	5 days
March	3 days	September	4 days
April	4 days	October	4 days
May	5 days	November	3 days
June	6 days	December	2 days

**TTU - Brownwood, Tx**

January	2 days	July	4 days
February	3 days	August	4 days
March	4 days	September	6 days
April	4 days	October	5 days
May	6 days	November	3 days
June	6 days	December	2 days

**TTU - Fredericksburg/Marble Falls, Tx**

January	4 days	July	4 days
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February	4 days	August	4 days
March	5 days	September	6 days
April	5 days	October	7 days
May	8 days	November	5 days
June	7 days	December	4 days

**TTU - Jefferson, Tx**

January	8 days	July	6 days
February	9 days	August	5 days
March	9 days	September	7 days
April	9 days	October	9 days
May	10 days	November	9 days
June	9 days	December	9 days

**TTU - Junction, Tx**

January	3 days	July	4 days
February	4 days	August	4 days
March	4 days	September	6 days
April	4 days	October	6 days
May	7 days	November	4 days
June	7 days	December	3 days

**TTU / TTUHSC - Metroplex (Dallas/Flower Mound/Forney/Mansfield), Tx**

January	5 days	July	4 days
February	6 days	August	4 days
March	7 days	September	3 days
April	7 days	October	6 days
May	9 days	November	7 days
June	8 days	December	7 days

**TTUHSC - Midland/Odessa, Tx**

January	2 days	July	4 days
February	2 days	August	4 days
March	2 days	September	5 days
April	3 days	October	4 days
May	4 days	November	2 days
June	4 days	December	2 days

**TTU - Sherman, Tx**

January	4 days	July	5 days
February	5 days	August	5 days
March	7 days	September	7 days
April	8 days	October	8 days
May	10 days	November	7 days
June	8 days	December	6 days

**TTU - Waco/Cleburne, Tx**

January	5 days	July	4 days
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February	6 days	August	4 days
March	6 days	September	6 days
April	6 days	October	7 days
May	9 days	November	6 days
June	7 days	December	5 days

END OF SECTION

Sample

## SECTION 01 25 00 SUBSTITUTION REQUEST PROCEDURES

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. TTUS Uniform General and Supplementary General Conditions Section 00 72 00 Article 8.
- C. TTUS FP&C Design & Construction Standards.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 01 60 00 Product Requirements - for submitting comparable product submittals for products by basis of design manufacturers.

#### 1.3 DEFINITIONS

- A. Substitutions: Deviation from the specified basis of design products, materials, manufacturers, or methods of construction from those stipulated by Construction Documents and bid by Construction Manager.
  - 1. Substitution for Cause: Changes proposed by Construction Manager, Contractor, or Subcontractor due to unavailability of specified materials, products, equipment manufacturer, or delayed delivery with the potential of impacting Substantial Completion, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitution for Convenience: Changes proposed by Construction Manager, Contractor, or Subcontractor, or Texas Tech not required to meet Project requirements but offering a clear benefit (cost savings, schedule acceleration, increase in quality for no additional costs, or increase in quantity for no additional costs, etc.) to Texas Tech.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Include Specification Section number and title, as well as Drawing numbers and titles.
  - 1. Substitution Request Form: Use TTUS FP&C provided form.
  - 2. Documentation: Show compliance with the requirements for substitutions and the following, as applicable:
    - a. Reason statement: Indicate reason for not providing specified item and why specified product or fabrication or installation method cannot be provided.
    - b. Proposed substitution: List product and/or material details and all listed differences from the specified item.
    - c. Coordination of information: Include a list of changes or revisions to the Work and construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution(s).



- d. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified: Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - e. Product Data: Include drawings and descriptions of products and fabrication and installation procedures.
  - f. Samples, where applicable or when requested.
  - g. Certificates and qualification data, as applicable, and when specified.
  - h. List of similar installations: For completed projects, with project names and addresses as well as names and addresses of Design Professionals and owners.
  - i. Material test reports: From a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
  - j. Research reports: Evidence of compliance with building code in effect for Project.
  - k. Detailed comparison of Construction Manager's construction schedule using proposed substitutions: With products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - l. Cost information: Include the cost of the proposed change, with associated back-up material costs provided in detail from the substitute materials manufacturer. Substitution requests cannot change Contract Sum, unless approved by Texas Tech.
  - m. Construction Manager's certification: That proposed substitution complies with requirements in Contract Documents, does not violate the prime Agreement except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - n. Construction Manager's waiver of rights: To additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Design Professional will notify Construction Manager of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Design Professional's supplemental instructions for minor changes in the Work.
  - b. Use product specified if Design Professional does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers, as required by the Design Professional and Texas Tech.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected Work as necessary to integrate Work of the substitutions, if approved in writing.

## 1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Texas Tech will consider Construction Manager's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Texas Tech will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with Contract Documents and will produce indicated results.
    - b. Requested substitution provides sustainable design characteristics, is in compliance with stipulated building and energy codes, meets TTUS FP&C Design and Construction Standards, and FM Global requirements.
    - c. Substitution request is fully documented and properly submitted.
    - d. Requested substitution is guaranteed to not adversely affect Construction Manager's construction schedule.
    - e. Requested substitution has received necessary approvals of authorities having jurisdiction (AHJ).
    - f. Requested substitution is compatible with other portions of the Work.
    - g. Requested substitution has been coordinated with other portions of the Work.
    - h. Requested substitution provides specified warranty.
    - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed unless properly requested from Texas Tech in sufficient amount of time to be considered within the Guaranteed Maximum Price to be submitted at fifty percent (50%) Construction Documents.
  - 1. Conditions: Texas Tech will consider Construction Manager's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Substitution request must consider and factor in potential Owner's additional costs to compensate Design Professional for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to Contract Documents.
    - c. Requested substitution is consistent with Contract Documents and will produce

indicated results.

- d. Requested substitution provides sustainable design characteristics, is in compliance with stipulated building and energy codes, meets TTUS FP&C Design and Construction Standards, and FM Global requirements.
- e. Substitution request is fully documented and properly submitted.
- f. Requested substitution will not adversely affect Construction Manager's construction schedule.
- g. Requested substitution has received necessary approvals of authorities having jurisdiction (AHJ).
- h. Requested substitution is compatible with other portions of the Work.
- i. Requested substitution has been coordinated with other portions of the Work.
- j. Requested substitution provides specified warranty.
- k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

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

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

END OF SECTION



# SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_  
 \_\_\_\_\_  
 From: \_\_\_\_\_  
 To: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_  
 A/E Project Number: \_\_\_\_\_  
 Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_  
 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Trade Name: \_\_\_\_\_ Model No.: \_\_\_\_\_  
 Installer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

History:  New product  1-4 years old  5-10 years old  More than 10 years old

Differences between proposed substitution and specified product: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: \_\_\_\_\_  
 \_\_\_\_\_

Similar Installation:

Project: \_\_\_\_\_ Architect: \_\_\_\_\_  
 Address: \_\_\_\_\_ Owner: \_\_\_\_\_  
 \_\_\_\_\_ Date Installed: \_\_\_\_\_

Proposed substitution affects other parts of Work:  No  Yes; explain \_\_\_\_\_  
 \_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_ (\$ \_\_\_\_\_).

Proposed substitution changes Contract Time:  No  Yes [Add] [Deduct] \_\_\_\_\_ days.

Supporting Data Attached:  Drawings  Product Data  Samples  Tests  Reports  \_\_\_\_\_

**SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION****PART 1. GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. TTUS FP&C Design & Construction Standards.

**1.2 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:
  - 1. General coordination procedures,
  - 2. Coordination drawings,
  - 3. Request for Information (RFI),
  - 4. Digital Project management procedures, and
  - 5. Project meetings.
- B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific Contractor.
- C. Related Requirements:
  - 1. Section 01 77 00 Closeout Requirements - for coordinating closeout of Contract.
  - 2. Section 01 91 13 General Commissioning Requirements - for coordinating Work with Owner's commissioning authority.

**1.3 DEFINITIONS**

- A. BIM: Building Information Modeling.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Subcontractors List: Prepare a written summary identifying subcontractors, their individual points of contact that can make decisions on behalf of the company for each portion of Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products,
  - 2. Number and title of related Specification Section(s) covered by subcontract, and
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
  - 4. Construction Manager is required to update and resubmit to Texas Tech the subcontractor list throughout the buyout process until buyout is complete.
- B. Key Personnel Names: Within fifteen (15) days after issuance of Notice to Proceed (NTP) and prior to start of construction operations, submit a list of key personnel assignments, including

superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities, include addresses, cellular telephone numbers, and e-mail addresses.

1. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
- C. Baseline Schedule: Refer to Section 00 72 00 Uniform General Conditions and Supplementary General Conditions, Article 1.
- D. Submittal Register: Refer to Section 00 72 00 Uniform General Conditions and Supplementary General Conditions, Article 1.
- E. Submittal Schedule: Refer to Section 00 72 00 Uniform General Conditions and Supplementary General Conditions, Article 1.

#### 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of Specifications to ensure efficient and orderly installation of each part of Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one (1) part of Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each Contractor shall coordinate its construction operations with those of other Contractors and entities to ensure efficient and orderly installation of each part of Work. Each Contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one (1) part of Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components with other Contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Coordinate installation of different components of Work with Owner provided furniture, fixtures, equipment, branding, interior art, public art, audio visual equipment, building networking technology, and any other systems not installed by Construction Manager or its Contractors.
  4. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other Contractors to avoid conflicts and rework, and to ensure orderly progress of Work. Such administrative activities

include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule,
2. Preparation of the Schedule of Values,
3. Worker wage rate forms,
4. Tool log form,
5. Allowance and Contingency reports,
6. Landscape enhancements expenditure reporting logs,
7. Installation and removal of temporary facilities and controls,
8. Delivery and processing of submittals,
9. Coordination with Owner provided Project work,
10. Public and private utilities shutdowns,
11. Coordination of site security, life, and safety,
12. Progress meetings,
13. Preinstallation conferences,
14. Project close out activities, and
15. Startup and adjustment of systems.

#### 1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to:

1. Requirements in individual Sections,
2. Where installation is not completely indicated on Shop Drawings,
3. Where limited space availability necessitates coordination, and/or
4. If coordination is required to facilitate integration of products and materials fabricated or installed by more than one (1) entity.
5. Content: Project-specific information is to be drawn accurately to a scale large enough to indicate and resolve conflicts.
  - a. Do not base coordination drawings on standard printed data.
  - b. Include the following information, as applicable:
    - i. Use applicable Drawings as a basis for preparation of coordination drawings,
      - 1) Prepare sections, elevations, and details as needed to describe the relationship of various systems and components.
    - ii. Coordinate addition of trade-specific information to 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,
    - iii. Indicate functional and spatial relationships of components of architectural,

structural, civil, mechanical, and electrical systems,

- iv. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation,
- v. Show location and size of access doors required for access to concealed dampers, valves, and other controls,
- vi. Indicate required installation sequences, and
- vii. Indicate dimensions shown on Drawings.
  - 1) Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements.
  - 2) Provide alternative sketches to Design Professional indicating proposed resolution of such conflicts.
  - 3) Minor dimension changes and difficult installations will not be considered changes to the Contract.

**B. Coordination Drawing Organization: Organize coordination drawings as follows:**

- 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire alarm, and electrical Work.
  - a. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
  - b. Supplement plan drawings with section drawings where required to adequately represent the Work.
- 2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work.
  - a. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings.
  - b. 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, and
  - c. Fire-rated enclosures around ductwork.
- 7. Electrical Work: Show the following:
  - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger,



- b. Light fixtures, light switches, occupancy sensors, emergency exit lights, and emergency battery pack locations,
  - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations,
  - d. Location of pull boxes and junction boxes, dimensioned from column center lines,
  - e. Fire alarm systems,
    - i. Show the following:
      - 1) Fire alarm control panels, remote annunciator panels, smoke detectors, pull stations, fire strobes, and other fire-alarm locations.
  - f. Fire protection system, and
    - i. Show the following:
      - 1) Locations of standpipes, risers, mains piping, branch lines, pipe drops, sprinkler heads, and hydraulic calculations data.
  - g. Electronic Access and Security System.
    - i. Show the following:
      - 1) Card readers, request to exit device, door position switches, video surveillance cameras, power supplies, and access control panel locations.
8. Review: Design Professional will review coordination drawings to confirm that in general Work is being coordinated, but not for the details of the coordination which are Contractor's responsibility.
- a. If the Design Professional determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will inform Contractor who shall make suitable modifications and resubmit.
9. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 Submittals.
- 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.
  - 2. File Submittal Format: Submit or post coordination drawing files using PDF format.
  - 3. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project, if required by Texas Tech.
    - a. Construction Manager will perform three-dimensional component conflict analysis as part of preparation of coordination drawings.
    - b. Resolve component conflicts prior to submittal.
    - c. Indicate where conflict resolution requires modification of design requirements by Design Professional.
  - 4. Design Professional will furnish Contractor one (1) set of digital data files of Drawings for use in preparing coordination digital data files.

- a. Design Professional makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
- b. Contractor shall execute a data licensing agreement with Design Professional.

#### 1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of Contract Documents, Contractor shall prepare and submit an RFI in the process specified in eBuilder.
  - 1. Coordinate and submit RFIs in a prompt manner in eBuilder to avoid delays in Work and construction schedule.
- B. Content of the RFI: Include a detailed, legible description of item(s) needing information or interpretation within eBuilder that at a minimum includes the following:
  - 1. TTUS FP&C Project name,
  - 2. TTUS FP&C Project number,
  - 3. Date,
  - 4. Name of Contractor and/or Subcontractor,
  - 5. Name of Design Professional and Construction Manager,
  - 6. RFI number (this number is automatically and sequentially assigned by eBuilder),
  - 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,
    - a. If Contractor's suggested resolution impacts Contract Time or Contract Sum, Contractor shall state impact in the RFI,
  - 12. Contractor's signature, and
  - 13. Attachments.
    - a. Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - b. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
  - 14. Attachments shall be electronic files in true, not scanned, PDF format (i.e. searchable) uploaded into eBuilder and associated with the RFI process in which the question is being posed.
- C. Design Professional's Action: Design Professional will review each RFI, determine action required, and respond in eBuilder within seven (7) working days.
  - 1. The following submitted RFIs will be returned without action:

- a. Requests for approval of submittals.,
    - i. Use submittal form in eBuilder.
  - b. Requests for approval of substitutions,
    - i. Requests for material substitutions must occur when the GMP is established and must be process approved prior to scope buyout.
  - c. Requests for approval of means and methods,
  - d. Requests for coordination information already indicated in Contract Documents,
  - e. Requests for adjustments in Contract Time or Agreement amount,
  - f. Requests for interpretation of Design Professional's or Owner's actions on submittals, and
  - g. Incomplete RFIs or inaccurately prepared RFIs.
2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will date from time of receipt by Design Professional of additional information.
  3. Design Professional's response to an RFI that may result in a potential scope change to the Project will be issued via a separate Construction Change Request (CCR) document per UGSC.
    - a. If Construction Manager believes RFI response warrants change in Contract Time or Contract Sum, Construction Manager is required to notify Texas Tech in writing within ten (10) calendar days of receipt of RFI response.
    - b. Failure to provide such written notification within this allocated time frame prohibits Construction Manager from requesting compensation past the allocated ten (10) calendar day time frame.
- D. RFI Log: Prepare, maintain, and submit a tabular log from eBuilder of RFIs organized by RFI number. Submit an updated log with each Project management meeting agenda.

## 1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Design Professional and all subconsultants warrant and agree to prepare all production related BIM and CAD files, becoming the Design Professional's instruments of services, to a minimum level of development (LOD) 350, based on the current version of BIMForum standards. The level of development of all production drawings contributing to the Design Professional's Construction Documents phase of services must be in adequate detail to convey with clarity the comprehensive design intent for accurate scope pricing.
- B. Digital data files (Design Professional's instruments of service): Construction Manager may request digital data files from Design Professional and subconsultants of 'Issue for Construction' Revit models or exported CAD files.
  1. Design Professional may charge Construction Manager a reasonable rate for the time required to prepare the digital files and for the export of Revit (.rvt) drawing files into CAD (.dwg) formatted files.
  2. Construction Manager is not permitted to make exhaustive requests for updated BIM or CAD files as scope changes occur unless Construction Manager is willing to pay for said digital data files from their Construction Manager fee portion.
    - a. Digital data files may be used by Subcontractors and materials suppliers in preparing

Project specific coordination and Shop Drawings.

- b. Design Professional makes no representations as to the accuracy or completeness of their digital data files as they relate to Construction Documents.
- c. Construction Manager understands the Design Professional's instruments of service convey design intent only and are not to be considered Shop Drawings.
- d. Construction Manager and their Contractors shall execute with Design Professional a data licensing agreement in the form of *AIA Document C106 Digital Data Licensing Agreement*, or an agreement form acceptable to both Texas Tech and Design Professional.
- e. Subcontractors and other parties granted access by Construction Manager to the Design Professional's digital data files shall execute a data licensing agreement in the form of *AIA Document C106 Digital Data Licensing Agreement*, or an agreement acceptable to both Texas Tech and Design Professional.

C. PDF Document Preparation: Where PDFs are required to be submitted, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate where indicated.
4. Do not submit PDF image files (scan to PDF). All submitted PDF files must be in true PDF format (i.e., searchable).

## 1.9 PROJECT MEETINGS

A. General: Construction Manager will schedule, and conduct Project related meetings and conferences as required by Texas Tech to fulfill their obligations for the Project.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of the date and time of each meeting. Notify Texas Tech and Design Professional of scheduled meeting dates and times a minimum of fourteen (14) working days prior to meeting.
2. Agenda: Prepare meeting agendas. Distribute agendas and required meeting documents to all invited attendees prior to the meeting.
3. Minutes: Construction Manager will record meeting discussions, directions issued, action items for further follow-up, and distribute the meeting minutes to everyone concerned, including Texas Tech and Design Professional, within three (3) working days after meeting.
4. At a minimum, the following meetings are required of Construction Manager, and responsible Contractors and Subcontractors for the delivery of Construction Services:
  - a. Preproposal meetings,
  - b. Contractor and Subcontractor selection meetings,
  - c. Preconstruction conference,
  - d. Preinstallation meetings (all trades),
  - e. Progress meetings,

- f. Furniture, fixture, and equipment (FFE) meetings,
  - g. Project closeout conference, and
  - h. Coordination meetings.
- B. Preproposal meetings: Construction Manager will conduct Preproposal meetings for every scope of the Work and provide Texas Tech the opportunity to participate.
- 1. Attendees: Prime bidders, proposers, Contractors, and Subcontractors.
  - 2. Agenda: Preproposal meeting agenda shall be developed by Construction Manager but will include review of topics that may affect proper preparation and submission of bids, including, but not limited to the following:
    - a. Procurement and contracting requirements,
      - i. Instructions for bidding,
      - ii. Qualifications and selection criteria requirements,
      - iii. Bonding and/or SDI,
      - iv. Insurance,
      - v. Bid security,
      - vi. Bid form and attachments,
      - vii. Bid submittal requirements,
      - viii. Bid submittal checklist, and
      - ix. Notice of award.
    - b. Communication during bidding period,
      - i. Obtaining documents,
      - ii. Access to Project website,
      - iii. Bidder's requests for information,
      - iv. Bidder's substitution request and/or prior approval request, and
      - v. Addenda.
    - c. Contracting Requirements,
      - i. Construction Manager's Agreement,
      - ii. Texas Tech front end requirements,
      - iii. TTUS Uniform General Conditions and Supplementary General Conditions (UGSC), and
      - iv. Other Owner requirements.
    - d. Construction Documents,
      - i. Scopes of Work,
      - ii. Temporary facilities,

- iii. Use of site,
  - iv. Work restrictions,
  - v. Alternates, allowances, and unit prices,
  - vi. Texas Tech Special Conditions, and
  - vii. Substitutions following award.
- e. Separate contracts,
    - i. Work by Owner and
    - ii. Work of other Contracts.
  - f. Schedule,
    - i. Project Schedule,
    - ii. Contract Time,
    - iii. Liquidated Damages, and
    - iv. Other Bidder Questions.
  - g. Site and/or facility visit or walkthrough, and
  - h. Post-meeting Addenda.
3. Minutes: Construction Manager will record and distribute meeting minutes to attendees. Minutes of meetings are issued as available information and do not constitute a modification to the contracting nor Construction Documents. Modifications to the contracting and Construction Documents can only be issued by written Addendum only.
  4. Sign-in Sheet: Minutes will include list of meeting attendees.
- C. Contractor and/or Subcontractor selection meetings: Construction Manager will schedule with Texas Tech selection meetings for every scope of the Work, make recommendations to Texas Tech, and gain agreement from Texas Tech on the best value selection for the Project, per Texas Education Code, Chapter 51. Provisions Generally Applicable to Higher Education.
1. Attendees: Construction Manager, Texas Tech, the component institution, Construction Manager Agent, if applicable, and others as warranted by Texas Tech.
  2. Process:
    - a. Construction Manager is to make solicitations by CSI Division and provide bid summary breakdowns per Specification Sections.
      - i. Each bidder is required to price each Specification Section separately, providing concise, detailed cost breakouts for materials (costs and lead time schedules), labor (regular and after hours), equipment rentals, overhead, and profit.
    - b. Construction Manager is to develop selection criteria and allocate points to each criterion for review by Texas Tech. Once approved, Construction Manager will use this criterion to evaluate each bidder's proposal.
    - c. Construction Manager is to solicit bids, receive bids, review and compare each bidder's proposal to each Specification Section to validate the scope of the Work, in its entirety, is accounted for within the bid price.

- i. In verifying with the bidder, Construction Manager is required to disclose all assumptions, clarifications, exclusion, substitutions, etc., to Texas Tech during the best value selection award meeting.
    - d. Construction Manager is to provide a consolidated Subcontractor evaluation summary matrix for evaluation and comparison for every Specification Section.
    - e. Construction Manager shall recommend their preferred bidder to Texas Tech for discussion and scope award based on the selection criteria and points ranking within the scoring matrix.
    - f. The recommended bidder's price shall be compared to the baseline GMP provided at fifty percent (50%) CD's, with cost differences tracked in a Construction Buyout Contingency log.
    - g. Construction Manager is to enter a Construction Change Proposal (CCP) into eBuilder to buyout each scope of the Work, indicating surplus or deficit amounts for each awarded bidder. The CCP must clearly indicate the Schedule of Values budget item(s) facilitating and funding the specific scope of the Work buyout.
    - h. Bids for self-performed Work must go through the same process and be evaluated against the same scoring criterion as other bidders.
      - i. A written notice of intent to bid as a self-performed Subcontractor must be submitted to TTUS FP&C ten (10) calendar days prior to the due date of bid submissions.
      - ii. Bids for self-performed work must be received by TTUS FP&C as a sealed bid no later than twenty-four (24) hours in advance of the due date and time deadline for proposer bid submissions.
      - iii. Texas Tech will determine if Construction Manager's bid to self-perform offers best value to the project.
    - i. Once buyout is complete for the original scope of the Work, per the terms of Agreement, Construction Manager will move buyout savings to Owner's Contingency.
      - i. In the event buyout results in a Construction Buyout Contingency log fund deficit, based on the GMP baseline numbers at fifty percent (50%) CD's, Construction Manager is required to fund the residual balance from Construction Manager's Contingency.
      - ii. In the instance where Construction Manager's Contingency becomes a negative balance, all remaining costs for completion of scope of the Work buyout will come from Construction Manager's fee.
  - 3. Agenda: As determined by Construction Manager.
  - 4. Minutes: Construction Manager will be responsible for recording and distribution of all meeting minutes, as well as any follow-up to finalize selection and award of the scopes of the Work.
- D. Preconstruction Conference: Construction Manager, in coordination with Texas Tech, will schedule and conduct a preconstruction conference before the start of construction activities, at a time convenient to Construction Manager and Design Professional, but no later than fifteen (15) days after issuance of Notice to Proceed (NTP) to Construction Manager.
- 1. Attendees: Authorized representatives of Texas Tech, the component institution, Design Professional, third-party commissioning authority, third-party materials testing, and inspection

company, Construction Manager, its superintendent and Project managers, major Subcontractors, suppliers, and other concerned parties shall attend the conference. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:
  - a. Introduction of Project team members, responsibilities, personnel assignments, and emergency procedures,
  - b. Construction schedule requirements (Owner coordinated work, NTP, construction milestones, Substantial Completion, and Final Completion),
  - c. Site logistics, execution logistics, and phasing,
  - d. Critical work sequencing and long lead items,
  - e. Designation of key personnel and their duties,
  - f. Lines of communications,
  - g. Use of web-based Project software, eBuilder,
  - h. Procedures for processing field decisions and Construction Change Requests (CCR),
  - i. Procedures for Construction Change Proposal (CCP) and Schedule of Values audit reviews, including internal and third-party auditing,
  - j. Procedures for testing and inspecting,
  - k. Procedures for processing Applications for Payment,
  - l. Distribution of the Contract Documents and use of Bluebeam Project,
  - m. Submittals, RFI's, ASI's, CCR's, CCP's, Applications for Payment, and field observation reporting procedures,
  - n. Sustainable design requirements, if applicable,
  - o. Preparation of Project Closeout (As-Builts, training, demonstrated operations, and Record Documents [O&M's, warranties, etc.]),
  - p. Use of the premises, construction site cleaning, and existing building protection,
  - q. Work restrictions, worker safety, Project site security, stormwater management, etc.,
  - r. Working hours,
  - s. Owner's occupancy requirements,
  - t. Responsibility for temporary facilities and controls,
  - u. Procedures for moisture and mold control,
  - v. Procedures for disruptions and shutdowns,
  - w. Construction waste management and recycling,
  - x. Parking availability,
  - y. Office, work, and storage areas, and



- z. Equipment deliveries and priorities.
3. Minutes: Texas Tech will be responsible for conducting this meeting, recording, and distributing meeting minutes.
- E. Preinstallation Meetings: Construction Manager is required to conduct preinstallation conferences at Project site prior to each construction trade partner, Contractor, and Subcontractor's start of their Work for proper coordination with other construction. Preinstallation Project meetings are to be scheduled with a minimum of fourteen (14) working days prior notice to Texas Tech. Construction Manager shall review Project processes, Project safety and security protocols, current Construction Documents requirements, Addenda, RFI, ASI, CCR, Submittals status, mockup requirements, materials testing and inspection requirements, owner training requirements, warranty requirements, TTUS FP&C Design and Construction Standards, FM Global requirements, component institution OPs, and other regulatory agency requirements (QEI, TCEQ, TDLR, SWPPP, etc.) with the trade partners, Contractors, and Subcontractors.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow shall attend the meeting. Advise Design Professional and Texas Tech of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the trade partner, Contractor, and Subcontractor under consideration, including requirements for the following:
    - a. Contract Documents,
    - b. Options,
    - c. Related RFIs.
    - d. Related Change Orders,
    - e. Purchases,
    - f. Deliveries,
    - g. Submittals,
    - h. Sustainable design requirements,
    - i. Review of mockups,
    - j. Possible conflicts and back charging of Work,
    - k. Compatibility requirements,
    - l. Time schedules,
    - m. Weather limitations,
    - n. Manufacturer's written instructions,
    - o. Warranty requirements,
    - p. Compatibility of materials,
    - q. Acceptability of substrates,
    - r. Temporary facilities and controls,

- s. Space and access limitations,
  - t. Regulations of authorities having jurisdiction (AHJ),
  - u. Testing and inspecting requirements,
  - v. Installation procedures,
  - w. Coordination with other work,
  - x. Required performance results,
  - y. Protection of adjacent work, and
  - z. Protection of construction and personnel.
3. Construction Manager shall record significant conference discussions, agreements, and clarifications, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate required actions necessary to resolve impediments to performance of Work and reconvene the conference at earliest feasible date, if required.
- F. Progress Meetings: Texas Tech, Construction Manager, and Design Professional will collectively conduct progress meetings as required by Texas Tech. At minimum the meetings will be held in bi-monthly intervals.
1. Coordinate dates of meetings to facilitate Architect's on-site reviews and validation of billing percentages for construction Applications for Payment.
  2. Attendees: Texas Tech, the component institution, Design Professional, Contractors, Subcontractors, suppliers, and others concerned with current progress or involved in planning, coordination, or performance of future activities of Project. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to Work.
  3. Agenda: Texas Tech will develop the meeting agenda. At a minimum the following will be reviewed:
    - a. Contractor's Construction Schedule:
      - i. Review progress since the last meeting.
      - ii. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.
      - iii. Document and report all activities behind schedule to Texas Tech and indicate reason.
      - iv. Determine how construction activities behind schedule will be expedited; secure commitments from parties involved to do so.
      - v. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.
      - vi. Review schedule for next period.
      - vii. Submit Time Extension Requests due to weather days on a monthly basis with the construction pay application.

b. Review present and future needs of each entity present, including the following:

- i. Interface requirements,
- ii. Sequence of operations,
- iii. Resolution of BIM component conflicts,
- iv. Status of submittals,
- v. Status of sustainable design documentation, if applicable,
- vi. Deliveries,
- vii. Off-site fabrication,
- viii. Access,
- ix. Site use,
- x. Temporary facilities and controls,
- xi. Progress cleaning,
- xii. Quality and work standards,
- xiii. Status of correction of deficient items,
- xiv. Field observations,
- xv. Status of RFIs,
- xvi. Status of Proposal Requests,
- xvii. Pending changes,
- xviii. Status of Change Orders,
- xix. Pending claims and disputes, and
- xx. Documentation of information for payment requests.

4. Minutes: Design Professional is responsible for recording and distributing the meeting minutes to each party present and to parties requiring information.

- a. Schedule Updating: Construction Manager is required to revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the progress meeting minutes.

G. Coordination Meetings: Construction Manager will conduct Project scope and management coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation meetings.

1. Attendees: Texas Tech, each Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings should be familiar with Project and authorized to conclude matters relating to Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Combined Contractor's Construction Schedule:
  - i. Review progress since the last coordination meeting.
  - ii. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule.
  - iii. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
  - iv. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.
- b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
- c. Review present and future needs of each Contractor present, including the following:
  - i. Interface requirements,
  - ii. Sequence of operations,
  - iii. Resolution of BIM component conflicts,
  - iv. Status of submittals,
  - v. Deliveries,
  - vi. Off-site fabrication,
  - vii. Access,
  - viii. Site use,
  - ix. Temporary facilities and controls,
  - x. Work hours,
  - xi. Hazards and risks,
  - xii. Progress cleaning,
  - xiii. Quality and work standards,
  - xiv. Status of RFIs,
  - xv. Proposal Requests,
  - xvi. Change Orders, and
  - xvii. Pending changes.

3. Reporting: Construction Manager will record meeting results and distribute copies to Texas Tech, Design Professional, every party in attendance, and to others affected by decisions or actions resulting from each meeting.

- H. Project Closeout Conference: Construction Manager will schedule and conduct a Project closeout conference, at a time convenient to Texas Tech and Design Professional, but no later than thirty (30) days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

- a. The following items are required to be verified as complete by the Construction Manager before Texas Tech will consider construction close out acknowledgement.
  - i. Certification of automatic fire suppression systems by authority having jurisdiction (AHJ),
  - ii. Certification of fire alarm systems by AHJ, inclusive of coordination with elevator conveyance and fire fighter recall,
  - iii. Certification of clean agent fire suppression systems by AHJ,
  - iv. Certification of wet chemical fire extinguishing systems by AHJ,
  - v. Elevator quality inspection (passing) for permitting purpose,
  - vi. Passing lab results for all bacteriological testing of domestic water systems,
  - vii. Complete commissioning, testing, adjusting, and balancing of required building systems with all identified corrective action items resolved,
  - viii. Design Professional certification that all identified punchlist items have been properly corrected by Construction Manager,
  - ix. All close out documentation (O&M's, warranties, As-Built, etc.) required by contract are uploaded into eBuilder, as well as all extra stock materials received by the component institution,
  - x. Complete As-Built Drawings are uploaded into eBuilder,
  - xi. All training documents and recorded training videos are uploaded into eBuilder,
  - xii. FFE product information, technical data, and manufacturer's maintenance recommendations for floor finishes, wall finishes, special materials, and equipment care are uploaded into eBuilder,
  - xiii. All checked out keys returned, and access permissions revoked by the component institution,
  - xiv. Other items, as defined by Contract Documents, and necessary for the component institution to operate and maintain the completed Project are uploaded into eBuilder, and
  - xv. Reconciliation of all third-party audit findings.
2. Schedule all required training and operational demonstrations in conformance with Texas Tech's schedule and protocols.
3. Attendees: Texas Tech, their consultants, Contractor and representing superintendents, major Subcontractors, suppliers, and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
4. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
  - a. Preparation of Record Documents,
  - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance,

- c. Procedures for completing and archiving web-based Project software site data files,
  - d. Submittal of written warranties,
  - e. Requirements for completing sustainable design documentation, if required,
  - f. Requirements for preparing operations and maintenance (M&O) data,
  - g. Requirements for delivery of material samples, attic stock, and spare parts,
  - h. Requirements for demonstration and training,
  - i. Preparation of Contractor's punchlist,
  - j. Procedures for processing Applications for Payment at Substantial Completion and for Final Payment,
  - k. Reconciliation of all third-party audit findings,
  - l. Final submittals procedures (eBuilder),
  - m. Coordination of separate contracts,
  - n. Owner's partial occupancy requirements,
  - o. Installation of Owner's furniture, fixtures, and equipment (FFE), and
  - p. Responsibility for removing temporary facilities and controls.
5. Minutes: Construction Manager will record and distribute meeting minutes, as well as required video recordings of training sessions.

**PART 2. PRODUCTS (NOT USED)**

**PART 3. EXECUTION (NOT USED)**

END OF SECTION

## SECTION 01 33 00 - SUBMITTALS

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00 Article 8.

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.
- B. Related Requirements
  - 1. Section 01 29 00 Payment Procedures - for submitting Applications for Payment and the Schedule of Values.
  - 2. Section 01 31 00 Project Management and Coordination - for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
  - 3. Section 01 32 00 Construction Progress Documentation - for submitting schedules and reports including Contractor construction schedule.
  - 4. Section 01 40 00 Quality Requirements - for submitting test and inspection reports and schedule of tests and inspections.
  - 5. Section 01 77 00 Closeout Requirements - for submitting closeout submittals and maintenance material submittals.
  - 6. Section 01 78 23 Operation and Maintenance Data - for submitting operation and maintenance (M&O) manuals.
  - 7. Section 01 78 39 Project Record Data - for submitting record Drawings, record Specifications, and record Product Data.
  - 8. Section 01 79 00 Demonstration and Training - for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Texas Tech and Architect responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Texas Tech and Architect responsive action.
  - 1. Submittals may be rejected for not complying with requirements.
  - 2. Informational submittals are those submittals indicated in individual Specification Sections as

"informational submittals."

#### 1.4 SUBMITTAL REGISTER

- A. Submittal Register: A list provided by Construction Manager of all items to be furnished for the Project for review by Texas Tech and Architect identified as a part of the Work in Contract Documents. Anticipated sequencing and submittal dates are to be included in the Submittal Register.
1. Refer to Section 00 72 00 Article 8.3 Texas Tech Uniform General and Supplementary General Conditions (UGSCs).
  2. A comprehensive Submittal Register is required to be submitted within twenty-one (21) days after Notice to Proceed (NTP) is issued to Construction Manager by Texas Tech.

#### 1.5 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit a list of all submittals required under the Specifications required for review and approval prior to execution of the Work. Arrange in chronological order by date as required to achieve the Baseline Schedule for construction and progress construction activities to Substantial Completion. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Texas Tech and Architect, and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with the Schedule of Values and Construction Manager's Baseline Schedule for construction.
  2. Initial submission: Submit concurrently no later than ten (10) days after Texas Tech's Preconstruction Meeting with Baseline Schedule for construction. Include submittals required to meet construction schedule for the first one hundred twenty (120) days of construction. List:
    - a. Submittals required to maintain orderly progress of the Work and
    - b. Submittals required early due to long lead time for manufacture or fabrication.
  3. Final Submission: Submit concurrently with the first complete submittal of Construction Manager's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal,
    - b. Specification Section number and title,
    - c. Submittal category,
      - i. Action or
      - ii. Informational
    - d. Name of subcontractor,
    - e. Description of the Work covered,
    - f. Scheduled date for Texas Tech and Architect's final release for approval,



- g. Scheduled dates for purchasing,
- h. Scheduled date of fabrication,
- i. Scheduled dates for installation, and
- j. Activity or event number.

## 1.6 SUBMITTAL FORMATS

- A. Submittal Information: Submittals are to be true PDF (i.e., searchable) electronic files, uploaded into eBuilder. Include the following information in each submittal:
  - 1. Project name,
  - 2. Date,
  - 3. Name of Architect,
  - 4. Name of Construction Manager,
  - 5. Name of Contractor,
  - 6. Name of firm or entity that prepared submittal,
  - 7. Name of subcontractor, manufacturer, and supplier,
  - 8. TTUS FP&C unique alpha-numeric submittal number, including six-digit Specification Section number, submittal sequencing number (numeric identifier), and revision identifier (alpha suffix identifier) for resubmittals,
  - 9. Category and type of submittal,
  - 10. Submittal purpose and description,
  - 11. Number and title of Specification Section with paragraph number and generic name for each of the multiple items,
  - 12. Drawing number and detail references, as appropriate,
  - 13. Indication of full or partial submittal,
  - 14. Location(s) where product is to be installed, as appropriate,
  - 15. Other necessary identification,
  - 16. Remarks, and
  - 17. Signature of transmitter.
- B. Options: Identify options requiring selection by Texas Tech and Architect.
- C. Deviations and additional information: On each submittal, clearly indicate deviations from requirements in Contract Documents including:
  - 1. Minor variations and limitations and
  - 2. Relevant additional information and revisions, other than those requested by Texas Tech and Architect on previous submittals.
    - a. Indicate by highlighting on each submittal or noting on attached separate sheet.

- D. PDF Submittals: Prepare submittals as true PDF (i.e., searchable) packages, incorporating complete information into each PDF file. Follow Texas Tech submittal file naming nomenclature for naming electronic files.
- E. Submittals for web-based Project software: Prepare submittals as true PDF (i.e., searchable) files, named correctly, and uploaded into eBuilder Project software website.

## 1.7 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Web-based Project software: Prepare submittals in true PDF (i.e., searchable) form and upload to eBuilder. Enter required data in e-Builder to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all action, informational, qualifications, and Shop Drawing submittal items required for each Specification Section concurrently as one submittal package.
    - a. Samples for approval may be submitted as a separate submittal.
    - b. Do not submit partial submittals for portions of the Work. Such submittals will be returned without review.
  - 3. Coordinate transmittal of submittals for related parts of the Work specified in different Specification Sections so processing will not be delayed due to need to review submittals concurrently for coordination.
    - a. Texas Tech and Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows:
  - 1. Time for review shall commence on Architect's receipt of submittal in eBuilder.
  - 2. No extension of the Contract Time will be authorized due to failure to transmit submittals within sufficient time prior to the Work to permit processing and resubmittals.
  - 3. Initial Review: Allow fifteen (15) days for initial review of each submittal.
    - a. Allow additional time if coordination with subsequent submittals is required.
    - b. Architect will advise Construction Manager when a submittal being processed must be delayed for coordination.
  - 4. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in the same format and number of copies as the initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Architect.

- E. Distribution: Upload copies of final submittals into eBuilder in “Final Submittal” folder.
  - 1. Final submittals are to be consolidated and include:
    - a. The original submittal with mark-ups or review comments,
    - b. Design Professional’s stamp of action to take on the submittal by Construction Manager, and
    - c. The electronic transmittal cover sheet generated by eBuilder.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final submittals that are marked with approval notation from Design Professional.

## 1.8 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction, and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data is unsuitable for use, submit as Shop Drawings, not as Product data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts,
    - b. Color charts,
    - c. Statement of compliance with specified referenced standards,
    - d. Testing by recognized testing agency,
    - e. Application of testing agency labels and seals,
    - f. Notation of coordination requirements, and
    - g. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring,
    - b. Printed performance curves,
    - c. Operational range diagrams, and
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in Contract Documents. Include the following information, as applicable:
    - a. Identification of products,

- b. Schedules,
  - c. Compliance with specified standards,
  - d. Notation of coordination requirements,
  - e. Notation of dimensions established by field measurement,
  - f. Relationship and attachment to adjoining construction clearly indicated, and
  - g. Seal and signature of professional engineer, if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number,
    - b. Generic description of sample,
    - c. Product name and name of manufacturer,
    - d. Sample source,
    - e. Number and title of applicable Specification Section, and
    - f. Specification paragraph number and generic name of each item.
  - 3. Web-based Project software: Prepare submittals in true PDF (i.e., searchable) format, and upload images of Samples into eBuilder. Enter required data in web-based software site to fully identify submittal.
    - a. In addition to eBuilder submission, transmit physical Samples to Texas Tech and Architect.
  - 4. Disposition: Maintain sets of approved samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine the final acceptance of construction associated with each set.
    - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Construction Manager.
  - 5. Samples for Initial Selection: Submit manufacturer color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two (2) full sets of available choices:
      - i. One (1) to Texas Tech and
      - ii. One (1) to Architect.
    - b. Each sample set is to include color, pattern, texture, or similar characteristics or options to be selected from manufacturer product line.
    - c. Architect will return submittal with sample options selected after consulting with Texas

Tech.

6. Samples For Verification:

- a. Submit full-size units or Samples of size indicated,
  - i. Prepared from same material to be used for the Work,
  - ii. Cured and finished in manner specified,
  - iii. Physically identical with material or product proposed for use, and
  - iv. Shows full range of color and texture variations expected.
- b. Samples include, but are not limited to, the following:
  - i. Partial sections of manufactured or fabricated components,
  - ii. Small cuts or containers of materials,
  - iii. Complete units of repetitively used materials,
  - iv. Swatches showing color, texture, and pattern,
  - v. Color range sets, and
  - vi. Components used for independent testing and inspection.
- c. Number of samples: Submit two (2) sets of samples.
  - i. Texas Tech and Architect will retain.
    - 1) Construction Manager is required to retain approved sample(s) at jobsite through construction.
  - ii. Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
  - iii. If variation in color, pattern, texture, or other characteristics is inherent in material or product represented by a sample, submit at least three (3) sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product,
  - a. Include unique identifier for each product indicated in Contract Documents or assigned by Contractor, if none is indicated.
2. Manufacturer, product name, and model number, if applicable,
3. Number and name of room or space, and
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections.
1. Include list of assumptions and summary of loads,
  2. Include load diagrams, if applicable,
  3. Provide name and version of software, if any, used for calculations, and
  4. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes the signature of entity responsible for preparing certification.
    - a. Shall be signed by an officer or other individual authorized to sign documents on behalf of that entity and
    - b. Provide a notarized signature where indicated.
  2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that installer complies with requirements in Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in Contract Documents. Include evidence of manufacturing experience where required.
  4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in Contract Documents.
  5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in Contract Documents.
  6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in Contract Documents.
    - a. Submit record of
      - i. Welding Procedure Specification and
      - ii. Procedure Qualification Record on AWS forms.
    - b. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
  2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location for compliance with requirements in Contract Documents.
  3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with

requirements in Contract Documents.

4. **Preconstruction Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product for compliance with performance requirements in Contract Documents.
5. **Product Test Reports:** Submit written reports indicating that current product produced by manufacturer complies with requirements in Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency or on comprehensive tests performed by a qualified testing agency.
6. **Research Reports:** Submit written evidence from a model code organization acceptable to authorities having jurisdiction (AHJ) stating that product complies with the building code in effect for Project. Include the following information:
  - a. Name of evaluation organization,
  - b. Date of evaluation,
  - c. Time period when report is in effect,
  - d. Product and manufacturer names,
  - e. Description of product,
  - f. Test procedures and results and,
  - g. Limitations of use.

#### 1.9 DELEGATED-DESIGN SERVICES

- A. **Performance and Design Criteria:** Where professional design services or certifications by a design professional are specifically required of Construction Manager by Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. **Delegated-design Services Certification:** In addition to Shop Drawings, Product Data, and other required submittals, submit PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Construction Manager to be designed or certified by a Design Professional.
  1. Indicate that products and systems comply with performance and design criteria in Contract Documents. Include list of codes, loads, standards, and other factors used in performing these services.

#### 1.10 CONSTRUCTION MANAGER'S REVIEW

- A. **Action Submittals and Informational Submittals:** Review each submittal and check for coordination with other Work of the Contract and for compliance with Contract Documents.
  1. Note corrections and field dimensions.
  2. Mark with approval stamp before submitting to Architect.
- B. **Construction Manager's Approval:** Indicate Construction Manager's approval for each submittal with a uniform approval stamp and in web-based Project software, eBuilder. Include name of reviewer, date of Construction Manager's approval, and statement certifying that submittal has

been reviewed, checked, and approved for compliance with Contract Documents.

1. Architect will not review submittals received from Construction Manager that do not have Construction Manager's review and approval.

#### 1.11 DESIGN PROFESSIONAL'S REVIEW

- A. Action Submittals: Design Professional will review each submittal indicating conformance with design intent, corrections, or revisions required, and return it via eBuilder.
  1. PDF Submittals: Design Professional will indicate, via markup on each submittal, the appropriate actions to take for approval.
  2. Submittals by web-based Project software: Design Professional will indicate, in TTUS FP&C Project software website, eBuilder, the appropriate action for approval.
- B. Informational Submittals: Design Professional will review each submittal. Submittal will be returned if it does not comply with requirements.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Design Professional.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Design Professional will discard submittals received from sources other than Construction Manager.
- F. Submittals not required by Contract Documents will be returned by Design Professional without action.

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

#### **PART 3. EXECUTION (Not Used)**

END OF SECTION



## SECTION 01 40 00 QUALITY REQUIREMENTS

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.
- B. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00.
- C. International Building Code, Chapter 17 Special Inspections (current adopted version of municipality).
- D. TTUS FP&C Design & Construction Standards.
- E. FM Global Approvals and Data Sheets.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements of the specifications. TTUS FP&C will provide third-party independent materials testing and inspection services for the Project. These services do not relieve the Construction Manager nor their subcontractors of responsibility for compliance with Contract Documents.
  1. Specific quality-assurance and quality-control requirements for individual Work results are specified in their respective Specification Sections. Requirements in individual sections may also cover production of standard products.
  2. Specified tests, inspections, and related actions are not intended to limit Construction Manager's other quality-assurance and quality-control procedures that facilitate compliance with Contract Document requirements.
  3. Requirements for Construction Manager to provide quality-assurance and quality-control services required by Texas Tech, Commissioning Authority, or authorities having jurisdiction (AHJ) are not limited by the provisions of this Section.
  4. Specific test and inspection requirements are not specified in this Section.
- C. Related Requirements:
  1. Section 01 42 00 Reference Standards - for minimum Project compliance.
  2. Section 01 91 13 General Commissioning Requirements - for minimum commissioning documentation requirements.
  3. Authority having jurisdiction (AHJ) certification requirements:
    - a. Fire suppression systems,
    - b. Fire alarm systems,
    - c. Vertical conveyance systems (elevators, lifts, LULA's, etc.),

- d. Texas Accessibility Standards,
- e. Accreditation requirements, and
- f. Other quality requirements as Project scope dictates.

### 1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means:
  - 1. Having successfully completed a minimum of five (5) years previous projects similar in nature, size, and extent to this Project;
  - 2. Being familiar with special requirements indicated; and
  - 3. Having complied with requirements of authorities having jurisdiction (AHJ).
- B. Field Quality-control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Construction Manager as an employee, subcontractor, or sub-subcontractor to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
  - 1. The use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction.
  - 1. Mockups are constructed to verify selections made under Sample submittals to:
    - a. Demonstrate aesthetic effects and qualities of materials and execution,
    - b. Review coordination, testing, or operation,
    - c. Show interface between dissimilar materials, and
    - d. Demonstrate quality of execution and compliance with specified installation tolerances.
  - 2. Mockups are not samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be evaluated for acceptance by Texas Tech.
  - 3. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
  - 4. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
  - 5. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified

criteria.

- F. **Product Tests:** Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction (AHJ), to establish product performance and compliance with specified requirements.
- G. **Source Quality-control Tests:** Tests and inspections that are performed at the source. For example: plant, mill, factory, or shop.
- H. **Testing Agency:** An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. **Quality-assurance Services:** Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. **Quality-control Services:** Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

#### 1.4 DELEGATED-DESIGN SERVICES

- A. **Performance and Design Criteria:** Where professional design services or certifications by a design professional are specifically required of Construction Manager by Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If the criterion indicated is not sufficient to perform services or certification required, submit a written request for additional information to Architect.

#### 1.5 CONFLICTING REQUIREMENTS

- A. **Conflicting Standards and Other Requirements:** If compliance with two (2) or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.6 ACTION SUBMITTALS

- A. **Shop Drawings:**
  - 1. Shop Drawings must be project specific and provide, with clarity, details that fully describe the intent of execution for the constructed conditions.
  - 2. Do not submit manufacturer's standard details as Project specific Shop Drawings.
  - 3. Do not submit Design Professional's instruments of service (Construction Documents) as Shop Drawings.

4. Include plans, sections, elevations, and details indicating materials, sizes, and constructed assemblages conveying accurate construction execution intent.
  5. Indicate manufacturer and model number of individual components.
  6. Provide axonometric drawings for conditions difficult to illustrate in two (2) dimensions.
- B. Delegated-design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible Design Professional for each product and system specifically assigned to Contractor to be designed or certified by a Design Professional, indicating that the products and systems follow performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Construction Manager's Construction Execution Plan: For site and Work execution logistic planning, phasing, coordination, sequencing, construction schedule management, safety, and regulatory compliance.
- B. Construction Manager's Quality-control Plan: For quality-assurance and quality-control activities and responsibilities.
- C. Construction Manager's Stormwater Pollution Prevention Plan (SWPPP): For active management of stormwater discharge and air pollution controls.
- D. Construction Manager's Security and Safety Plan: For Project site safety for personnel and workers in compliance with OSHA requirements and Texas Tech security compliance requirements relative to Article 7 of Section 00 72 00 Texas Tech Uniform General and Supplementary General Conditions.
- E. Qualification Data: For Construction Manager's quality-control of personnel, subcontractors, and other related vendors.
- F. Construction Manager's Statement of Responsibility: When required by authorities having jurisdiction (AHJ), submit a copy of written statement of responsibility submitted to AHJ before starting Work on the following systems:
  1. Provisional, temporary life and safety, and means of egress facilitation during construction of Work.
  2. Seismic-force-resisting system, designated seismic system, or components listed in IBC Chapter 17 Special Inspections.
  3. Main wind-force-resisting system or a wind-resisting component listed in IBC Chapter 17 Special Inspections.
- G. Laboratory Testing Agency Qualifications: For testing agencies specified under Section 1.10 Quality Assurance to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- H. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  1. Specification Section number and title,
  2. Entity responsible for performing tests and inspections,
  3. Description of test and inspection,
  4. Identification of applicable standards,

5. Identification of test and inspection methods,
  6. Number of tests and inspections required,
  7. Time schedule or time span for tests and inspections,
  8. Requirements for obtaining samples, and
  9. Unique characteristics of each quality-control service.
- I. Submit schedule of specified systems requiring training and reference Specification Section.
  - J. Submit schedule of specified materials listed of extra or attic stock and the quantity required to be delivered to the component institution per the specification.
  - K. Reports: Prepare and submit certified written reports and documents in eBuilder as required under the Agreement.
  - L. Permits, Licenses, and Certificates (if required by Project): For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.
- 1.8 CONTRACTOR'S QUALITY-CONTROL PLAN
- A. Quality-control Plan, General: Submit Construction Manager's quality-control plan within thirty (30) days after Notice to Proceed (NTP), but not less than five (5) days prior to Texas Tech's Preconstruction conference.
    1. Submit in format acceptable to Texas Tech.
    2. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities.
    3. Coordinate with the critical path Construction Schedule.
  - B. Quality-control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for the Project.
    1. Project quality-control manager may also serve as Project superintendent.
  - C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
  - D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of the Work requiring testing or inspection, including the following:
    1. Construction Manager performed tests and inspections including Subcontractor performed tests and inspections. Include required tests and inspections and Contractor elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
    2. Special inspections required for regulatory compliance, by the authorities having jurisdiction (AHJ), and as indicated in the Statement of Special Inspections.
    3. Owner's third-party materials testing and inspections indicated within Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.

- E. **Continuous Inspection of Workmanship:** Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. **Monitoring and Documentation:** Maintain testing and inspection reports including logs of approved and rejected results. Include:
  - 1. Work Texas Tech representatives and Architect have indicated as nonconforming or defective,
  - 2. Indicate corrective actions taken to bring nonconforming work into compliance with requirements.
  - 3. Comply with requirements of authorities having jurisdiction (AHJ).

## 1.9 REPORTS AND DOCUMENTS

### A. Test and Inspection Reports:

- 1. Texas Tech will provide third-party materials testing and inspection services for the Project for the purpose of verifying constructed conditions are in conformance with the specifications. This testing is not intended to replace Contract Document requirements in which Construction Manager and its subcontractors are required to provide and submit to demonstrate conformance with proposed materials and methods as stipulated by the specifications.
- 2. Construction Manager and its Subcontractor will prepare and submit written reports as required per the specifications and as required by Texas Tech for the following:
  - a. All testing and inspection reports as stipulate under each section of the Project specifications,
  - b. Stormwater Pollution Prevention Plan (SWPPP) inspection documentation,
  - c. Soils analysis testing for import fill, if import fill is used,
  - d. Duct pressure testing for air supply HVAC building systems,
  - e. Water column pressure testing for domestic water piping,
  - f. Pressurized testing for domestic water and fire suppression systems,
  - g. Bacteriological testing for domestic and well water systems,
  - h. Emergency generator load bank testing,
  - i. Arc flash electrical systems testing,
  - j. Lightning protection impedance testing,
  - k. Glazed fenestration water penetration testing,
  - l. Air barrier coverage and proper thickness application,
  - m. Special testing for scheduled special equipment and building systems,
  - n. Commissioning submittals, checklists, and test reporting as required under Section 01 91 13 General Commissioning Requirements, and

- o. Other subcontractor testing, as required, under each section of the specifications, Texas Tech, or Architect.
- B. Include the following on each report:
  1. Date of issue,
  2. TTUS FP&C project name (title) and project number,
  3. Name, address, telephone number, and email address of testing agency,
  4. Dates, times, and graphic locations of samples and tests or inspections made,
  5. Names of individuals making tests and inspections,
  6. Description of the Work and test and inspection method,
  7. Identification of product and Specification Section,
  8. Complete test or inspection data,
  9. Test and inspection results and an interpretation of test results,
  10. Record of temperature and weather conditions at time of sample taking and testing and inspection,
  11. Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements,
  12. Name and signature of laboratory inspector, and
  13. Recommendations on retesting and reinspecting.
- C. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  1. Name, address, telephone number, and email address of technical representative making report,
  2. Statement on condition of substrates and their acceptability for installation of product,
  3. Statement that products at Project site comply with requirements,
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken,
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements,
  6. Statement whether conditions, products, and installation will affect warranty, and
  7. Other required items indicated in individual Specification Sections.
- D. Factory-authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  1. Name, address, telephone number, and email address of factory-authorized service representative making report,

2. Statement that equipment complies with requirements,
3. Results of operational and other tests and a statement of whether observed performance complies with requirements,
4. Statement whether conditions, products, and installation will affect warranty, and
5. Other required items indicated in individual Specification Sections.

#### 1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required. Individual specification sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems like those indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce the required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce the required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain specification sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy the qualification requirements indicated and shall be engaged for the activities indicated.
  1. Requirements of authorities having jurisdiction (AHJ) shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to Contract Documents, ASTM E 329, and with additional qualifications specified in individual sections, and where required by authorities having jurisdiction (AHJ), that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for



compliance with specified requirements for performance and test methods, comply with the following:

1. Construction Manager's responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform the same tasks for project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, test assemblies, mockups, and laboratory mockups. Do not reuse products on Project.
  2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Texas Tech with copies as indicated by Texas Tech. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements using materials indicated for the completed Work:
1. Build mockups of size indicated,
  2. Build mockups in location indicated or, if not indicated, as directed by Texas Tech and Architect,
  3. Notify Texas Tech and Architect seven (7) days in advance of dates and times when mockups will be constructed,
  4. Employ supervisory personnel who will oversee mockup construction,
    - a. Employ workers that will be employed to perform the same tasks during the construction of the Work at Project.
  5. Demonstrate the proposed range of aesthetic effects and quality workmanship,
  6. Obtain Texas Tech and Architect's approval of mockups before starting corresponding Work, fabrication, or construction for completion of the Project,
    - a. Allow seven (7) days for initial review and each re-review of each mockup.
  7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work, and
  8. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup if authorized by Texas Tech. Coordinate installation of exterior envelope materials and products for which mockups are required

in individual specification sections, along with supporting materials, if approved by Texas Tech. Comply with requirements "Mockups" Paragraph.

- M. Room Mockups: Construct room mockups incorporating required materials and assemblies and finished according to requirements. Provide required lighting and additional lighting where required to enable Texas Tech and Architect to evaluate quality of the Work. Comply with requirements in "Mockups" Paragraph.
- N. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual specification sections.

#### 1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by executed Work that failed to comply with Contract Documents will be charged to Construction Manager, and Contract Sum will be adjusted by Construction Change Proposal (CCP) in eBuilder.
- B. Construction Manager's Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
  - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction (AHJ). Perform quality-control services required of Construction Manager by AHJ, whether specified or not.
  - 2. Engage a qualified testing agency to perform quality-control services.
  - 3. Notify testing agencies at least forty-eight (48) hours in advance of time when Work that requires testing or inspection will be performed.
  - 4. Where quality-control services are indicated as Construction Manager's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 5. Testing and inspection requested by Construction Manager and not required by Contract Documents are Construction Manager's responsibility.
  - 6. Submit additional copies of each written report directly to authorities having jurisdiction (AHJ) when so directed.
- C. Retesting and/or Reinspecting: Regardless of whether original tests or inspections were Construction Manager's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with Contract Documents.
- D. Construction Manager's Testing Agency Responsibilities: Cooperate with Texas Tech, Texas Tech's Construction Manager Agent, if part of team, and Construction Manager in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Texas Tech, Architect, and Construction Manager promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written electronic true (searchable) PDF report of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform duties of Construction Manager.
- E. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 Submittals.
- F. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. **Construction Manager's Associated Responsibilities for Testing of Work:** Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work,
  2. Incidental labor and facilities necessary to facilitate tests and inspections,
  3. Adequate quantities of representative samples of materials that require testing and inspection,
    - a. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples,
  5. Delivery of samples to testing agencies,
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency, and
  7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests and inspections, obtaining samples, and similar activities.
- I. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by Contract Documents.
1. Coordinate and submit concurrently with Construction Manager's critical path Construction Schedule.

2. Update as the Work progresses.
3. Distribution: Distribute schedules to Texas Tech and Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.12 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Texas Tech will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction (AHJ) as a responsibility of the current adopted version of IBC Chapter 17, Special Inspections. The Construction Manager's responsibilities for special tests and inspections are as follows:
  1. Verify that manufacturer maintains detailed fabrication and quality-control procedures and review the completeness and adequacy of those procedures to perform the Work,
  2. Notify Texas Tech and Architect promptly of irregularities and deficiencies observed in the Work during performance of its services,
  3. Submit a certified written report of each test, inspection, and similar quality-control service to Texas Tech and Architect with copy to subcontractor and to authorities having jurisdiction (AHJ),
  4. Submit a final report of special tests and inspections at Substantial Completion which includes a list of unresolved deficiencies, and
  5. Retest and reinspect corrected work.

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

### **PART 3. EXECUTION**

#### 3.1 ACCEPTABLE TESTING AGENCIES

- A. Select and utilize a Materials Testing and Inspection firm from Texas Tech's professional services pre-qualification list.

#### 3.2 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted,
  2. Description of the Work tested or inspected,
  3. Date test or inspection results were transmitted to Texas Tech and Architect, and
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain logs at Project site. Post changes and revisions as they occur. Provide access to test and inspection logs for Texas Tech and Architect's reference during normal working hours.
  1. Submit logs at Project Closeout as part of Project Record Documents.

#### 3.3 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other specification sections or matching existing substrates and finishes.
  2. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  3. Comply with Contract Document requirements for cutting and patching.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are construction manager's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

## SECTION 01 42 00 REFERENCE STANDARDS

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

#### 1.2 STANDARDS

- A. Reference to standards, codes, Specifications, recommendations, and regulations refer to the latest edition or printing prior to date of issue of Contract Documents.
- B. Applicable portions of standards listed that are not in conflict with Contract Documents are hereby made a part of the Specifications.
- C. Modifications or exceptions to Standards shall be considered as amendments and unmodified portions shall remain in full effect. In cases of discrepancies between standards, the more stringent requirements shall govern.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

#### 1.3 SCHEDULE OF STANDARDS

AA	Aluminum Association 1525. Wilson Boulevard, Suite 600, Arlington, VA 22209 703-3582960 fax 703-358-2961 <a href="http://www.aluminum.org/">http://www.aluminum.org/</a>
AABC	Associated Air Balance Council 1518 K St., NW Washington, DC 20005 (202) 737 0202 <a href="http://www.aabchq.com/">http://www.aabchq.com/</a>
AAMA	American Architectural Manufacturers Assoc. 1827 Walden Office Square, Suite 550 Schaumburg, IL 60173-4268 Phone: (847) 303-5664 Fax: (847) 303-5774 <a href="http://www.aamanet.org/">http://www.aamanet.org/</a>
AAN	American Association of Nurserymen 1250 I St., NW, Suite 500 Washington, DC 20005 (202) 789 2900

ANLA	American Nursery and Landscape Association 1000 Vermont Avenue, NW, Suite 300 Washington D.C. 20005 – 4914 202-789-2900 <a href="http://www.anla.org/index.htm">http://www.anla.org/index.htm</a>
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol St., Suite 225 Washington, DC 20001 (202) 624 5800 <a href="http://www.transportation.org/">http://www.transportation.org/</a>
ACI	American Concrete Institute 38800 Country Club Dr. Farmington Hills, MI 48331 USA Phone: 248-848-3700 Fax: 248-848-3701 <a href="http://www.aci-int.org/general/home.asp">http://www.aci-int.org/general/home.asp</a>
ACIL	American Council of Independent Laboratories 1629 K St., NW Washington, DC 20006 (202) 887 5872 <a href="http://www.acil.org/">http://www.acil.org/</a>
ACPA	American Concrete Pipe Assoc. 1303 West Walnut Hill Lane, Suite 305 Irving, Texas 75038-3008 Phone (972) 506-7216 Fax (972) 506-7682 <a href="http://www.concrete-pipe.org">http://www.concrete-pipe.org</a>
ADC	Air Diffusion Council 1901 N. Roselle Road, Suite 800 Schaumburg, Illinois 60195 Tel: (847) 706-6750 Fax: (847) 706-6751 <a href="http://www.flexibleduct.org/">http://www.flexibleduct.org/</a>
AI	Asphalt Institute 2696 Research Park Drive Lexington, KY 40512 4052 (606) 288 4960 <a href="http://www.asphaltinstitute.org/ai_pages/Seminars/index.asp">http://www.asphaltinstitute.org/ai_pages/Seminars/index.asp</a>
AIA	American Institute of Architects 1735 New York Ave., NW Washington, DC 20006 (202) 626 7300 <a href="http://www.aia.org/">http://www.aia.org/</a>
AIHA	American Industrial Hygiene Assoc.

P 2700 Prosperity Ave., Suite 250  
 Fairfax, VA 22031  
 (703) 849-8888  
<http://www.aiha.org/Content>

- AISC American Institute of Steel Construction  
 One East Wacker Drive, Suite 3100  
 Chicago, IL 60601 2001  
 (312) 670-2400  
<http://www.aisc.org/>
- AISI American Iron and Steel Institute  
 1140 Connecticut Ave., NW  
 Suite 705  
 Washington, D.C. 20036  
 202.452.7100  
<http://www.steel.org//AM/Template.cfm?Section=Home>
- AITC American Institute of Timber Construction  
 7012 S. Revere Parkway Suite 140  
 Centennial, CO 80112  
 Phone: (303) 792-9559  
 FAX: (303) 792-0669  
<http://www.aitc-glulam.org/>
- ALI Associated Laboratories, Inc.  
 500 S. Vermont St.  
 Palatine, IL 60067  
 (800) 685-0026  
<http://www.associatedlabs.org/>
- ALSC American Lumber Standards Committee  
 P.O. Box 210  
 Germantown, MD 20875  
 (301) 972 1700  
<http://www.alsc.org/>
- AMCA Air Movement and Control Assoc.  
 30 W. University Drive  
 Arlington Heights, IL 60004 1893 (847) 394-0150  
<http://www.amca.org/>
- ANSI American National Standards Institute  
 1819 L Street, NW, 6th Fl.  
 Washington, DC, 20036  
 Tel: 202.293.8020  
 Fax: 202.293.9287  
<http://www.ansi.org/>
- APA American Plywood Assoc.  
 7011 So. 19th,  
 Tacoma, WA 98466



Tel: (253) 565-6600  
Fax: (253) 565-7265  
<http://www.apawood.org/>

- ARI Air Conditioning and Refrigeration Institute  
4100 North Fairfax Drive, Suite 200  
Arlington, Virginia 22203  
(703) 524-8800  
(703) 528-3816 FAX  
<http://www.ari.org/>
- ARMA Asphalt Roofing Manufacturers Assoc.  
Public Information Department  
1156 - 15th Street, NW., Suite 900  
Washington, DC 20005  
Tel: 202 / 207-0917 / Fax: 202 / 223-9741  
<http://www.asphaltroofing.org/>
- ASA Acoustical Society of America  
2 Huntington Quadrangle, Suite 1N01  
Melville, NY 11747-4502  
Phone: (516) 576-2360  
Fax: (516) 576-2377  
<http://asa.aip.org/>
- ASC Adhesive and Sealant Council  
7979 Old Georgetown Road, Suite 500 |  
Bethesda, Maryland 20814  
Phone: (301) 986-9700 | Fax: (301) 986-9795  
<http://www.ascouncil.org/>
- ASHRAE American Society of Heating, Refrigerating  
and Air Conditioning Engineers  
1791 Tullie Circle, NE  
Atlanta, GA 30329  
Phone: (404) 636-8400  
Fax: (404) 321-5478  
<http://www.ashrae.org/>
- ASME American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990  
800-843-2763 (U.S./Canada)  
<http://www.asme.org/>
- ASPE American Society of Plumbing Engineers  
8614 Catalpa Avenue, Suite 1007  
Chicago, IL 60656-1116  
Phone: (773) 693-ASPE (2773)  
Fax: (773) 695-9007  
<http://www.aspe.org/>

ASSE	American Society of Sanitary Engineering 901 Canterbury, Suite A Westlake, OH 44145 Phone - 440.835.3040 / FAX - 440.835.3488 <a href="http://www.asse-plumbing.org/">http://www.asse-plumbing.org/</a>
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, Pennsylvania, 19428-2959 USA Phone: (610) 832-9500 Fax: (610) 832-9555 <a href="http://www.astm.org">http://www.astm.org</a>
AWCMA	American Window Covering Manufacturers Assoc. 355 Lexington Ave, 17th Floor New York, NY 10017 Phone: (212) 297-2122 / Fax: (212) 370-9047 <a href="http://www.wcmanet.org">http://www.wcmanet.org</a>
AWI	Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165 phone 571-323-3636 / fax 571-323-3630 <a href="http://www.awinet.org/">http://www.awinet.org/</a>
AWPA	American Wood Preservers' Assoc. P.O. Box 361784 Birmingham, AL 35236-1784 Telephone: 205-733-4077 <a href="http://www.awpa.com/">http://www.awpa.com/</a>
AWPB	American Wood Preservers Bureau 4 E. Washington St. Newnan, GA 30263 (404) 254 9877
AWS	American Welding Society 50 N.W. LeJeune Road, Miami, Florida 33126 Phone: 800-443-9353 or 305-443-9353 <a href="http://www.aws.org/w/a/">http://www.aws.org/w/a/</a>
BHMA	Builders' Hardware Manufacturers Assoc. 355 Lexington Ave., 15th Floor New York, NY 10017 Tel: (212) 297-2122 / Fax: (212) 370-9047 <a href="http://www.buildershardware.com/">http://www.buildershardware.com/</a>
BIA	The Brick Industry Association 1850 Centennial Park Drive, Suite 301, Reston, VA 20191 Phone: 703.620.0010 Fax: 703.620.3928. <a href="http://www.bia.org/">http://www.bia.org/</a>

- BIFMA Business and Institutional Furniture Manufacturers Assoc.  
2680 Horizon Drive, SE / Suite A-1  
Grand Rapids, MI 49546-7500  
Phone: 616-285-3963 / Fax: 285-3765  
<http://www.bifma.org/>
- CFFA Chemical Fabrics & Film Association, Inc.  
c/o Thomas Associates, Inc.  
1300 Sumner Ave.  
Cleveland, OH 44115 2851 (216) 241 7333  
<http://www.chemicalfabricsandfilm.com/index.html>
- CISCA Ceiling and Interior Systems Construction Assoc.  
5700 Old Orchard Road, 1st Floor  
Skokie, IL 60077 (708) 965 2776  
<http://www.cisca.org/>
- CISPI Cast Iron Soil Pipe Institute  
5959 Shallowford Road, Suite 419  
Chattanooga, TN 37421  
Phone: (615) 892 0137 / Fax: 423-892-0817  
<http://www.cispi.org/>
- CRI Carpet and Rug Institute  
P.O. Box 2048  
Dalton, GA 30722  
(404) 278 3176  
Phone: 706-278-3176 Fax: 706-278-8835  
<http://www.carpet-rug.org/>
- CRSI Concrete Reinforcing Steel Institute  
933 North Plum Grove Road  
Schaumburg, IL 60173-4758  
Phone: 847.517.1200 / Fax: 847.517.1206  
<http://www.crsi.org/>
- CTIOA Ceramic Tile Institute of America  
12061 Jefferson Blvd  
Culver City, CA 90230-6219  
Phone: (310) 574-7800 / Fax: (310) 821-4655  
<http://www.ctioa.org/>
- DHI Door and Hardware Institute  
14150 Newbrook Dr., Suite 200  
Chantilly, VA 20151  
Telephone: 703.222.2010 / Fax: 703.222.2410  
<http://www.dhi.org/>
- ETL ETL Testing Laboratories, Inc.  
P.O. Box 2040  
Route 11, Industrial Park  
Cortland, NY 13045

	(607) 753 6711 <a href="http://www.etl.com/">http://www.etl.com/</a>
ECDS	Energy Conservation Design Standards for New State Buildings State Energy Conservation Office Texas Facilities Commission P.O. Box 13047 Austin, TX 78711-3047
FGMA	Flat Glass Marketing Assoc. The Flat Glass Marketing Association, Glass Tempering Association, and members of the Laminators Safety Glass Association consolidated to form the Glass Association of North America. 2495 SW Wanamaker Drive, Suite A Topeka, KS 66614 Phone: (785) 271-0208 / Fax: (785) 271-0166 <a href="http://www.glasswebsite.com/publications/default.asp">http://www.glasswebsite.com/publications/default.asp</a>
FM	Factory Mutual Research Organization 1151 Boston Providence Turnpike P.O. Box 9102 Norwood, MA 02062 (617) 762 4300
GA	Gypsum Association 810 First St., NE, #510 Washington DC, 20002 Phone: 202-289-5440; Fax: 202-289-3707 <a href="http://www.gypsum.org/">http://www.gypsum.org/</a>
HMA	Hardwood Manufacturers Assoc. 400 Penn Center Blvd., Suite 530 Pittsburgh, PA 15235 Phone - (412) 829-0770 Fax - (412) 829-0844 <a href="http://www.hmamembers.org/">http://www.hmamembers.org/</a>
HPMA	Hardwood Plywood Manufacturers Assoc. (Formerly HPMA) 1825 Michael Farraday Drive Reston, VA 20190 Phone: (703) 435 2900 / Fax: (703) 435-2537 <a href="http://www.hpva.org/">http://www.hpva.org/</a>
IBC	International Building Code International Code Council 500 New Jersey Ave., NW, 6th Floor Washington, DC 20001-2070
IBD	Institute of Business Designers 341 Merchandise Mart Chicago, IL 60654 (312) 647 1950

ICC	International Code Council 500 New Jersey Avenue, NW, 6th Floor Washington, DC 20001 [P] 1-888-ICC-SAFE (422-7233); [F] (202) 783-2348; <a href="http://www.iccsafe.org/">http://www.iccsafe.org/</a>
IECC	International Energy Conservation Code <a href="http://www.iccsafe.org/">http://www.iccsafe.org/</a>
IEEE	Institute of Electrical and Electronic Engineers 3 Park Avenue, 17th Floor New York, N.Y., 10016-5997 USA Phone: 212 419 7900 / Fax: 212 752 4929 <a href="http://www.ieee.org/portal/site">http://www.ieee.org/portal/site</a>
IESNA	Illuminating Engineering Society of North America 120 Wall Street, Floor 17 New York, NY 10005 tel: 212-248-5000 / fax: 212-248-5017/18 <a href="http://www.iesna.org/">http://www.iesna.org/</a>
IFC	International Fire Code <a href="http://www.iccsafe.org/">http://www.iccsafe.org/</a>
IGCC	Insulating Glass Certification Council c/o ETL Testing Laboratories, Inc. PO Box 9 Henderson Harbor, NY 13651 Phone: (315) 646-2234 / Fax: (315) 646-2297 <a href="http://www.igcc.org/">http://www.igcc.org/</a>
ILI	Indiana Limestone Institute of America 400 Stone City Bank Bldg. Bedford, Indiana 47421 Phone: 812-275-4426 FAX: 812-279-8682 <a href="http://www.iliai.com/">http://www.iliai.com/</a>
IPC	International Plumbing Code <a href="http://www.iccsafe.org/">http://www.iccsafe.org/</a>
ISA	Instrument Society of America 67 Alexander Drive, Research Triangle Park, NC 27709 USA Phone (919) 549-8411   FAX (919) 549-8288 <a href="http://www.isa.org/">http://www.isa.org/</a>
LIA	Lead Industries Association, Inc. Sparta, New Jersey <a href="http://leadinfo.com">http://leadinfo.com</a>
LPI	Lightning Protection Institute

25475 Magnolia Drive  
 P.O. Box 99  
 Maryville, MO 64468  
 (800) 488-6864  
<http://www.lightning.org/>

- MBMA** Metal Building Manufacturer's Assoc.  
 1300 Sumner Ave  
 Cleveland, OH 44115-2851  
 Phone: (216) 241-7333 / Fax: (216) 241-0105  
<http://www.mbma.com/>
- MCAA** Mechanical Contractors Association of America  
 1385 Piccard Drive  
 Rockville, MD 20850  
 Phone: 301-869-5800 / Fax: 301-990-9690  
<http://www.mcaa.org/>
- MFMA** Maple Flooring Manufacturers' Assoc.  
 60 Revere Drive, Suite 500  
 Northbrook, IL 60062  
 Phone: 888 480-9138 / Fax: 847 480-9282  
<http://www.maplefloor.org/>
- MIA** Marble Institute of America  
 28901 Clemens Rd, Ste 100  
 Cleveland, OH 44145  
 T: 440-250-9222 · F: 440-250-9223  
<http://www.marble-institute.com/>
- ML/SFA** Metal Lath/Steel Framing Assoc.  
 (A Division of the National Association of Architectural Metal Manufacturers)  
 800 Roosevelt Rd.. Bldg. C, Suite 312  
 Glen Ellyn, IL 60137  
 Telephone: (630) 942-6591 / Fax: (630) 790-3095  
<http://www.naamm.org/index.html>
- NAAMM** National Association of Architectural Metal Manufacturers  
 800 Roosevelt Rd.. Bldg. C, Suite 312  
 Glen Ellyn, IL 60137  
 Telephone: (630) 942-6591 / Fax: (630) 790-3095  
<http://www.naamm.org/index.html>
- NAIMA** North American Insulation Manufacturers Assoc.  
 44 Canal Center Plaza, Suite 310  
 Alexandria, VA 22314  
 Phone: (703) 684-0084 / Fax: (703) 684-0427  
<http://www.naima.org/>
- NAPA** National Asphalt Pavement Assoc.  
 NAPA Building  
 5100 Forbes Blvd.

	Lanham, MD 20706 888-HOT-MIXX (468-6499) <a href="http://www.hotmix.org/">http://www.hotmix.org/</a>
NCMA	National Concrete Masonry Assoc. 13750 Sunrise Valley Drive Herndon, VA 20171-4662 Phone: 703.713.1900 / Fax: 703.713.1910 <a href="http://www.ncma.org/">http://www.ncma.org/</a>
NEC	National Electrical Code (from NFPA)
NECA	National Electrical Contractors Assoc. 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814 Phone: (301) 657-3110   Fax: (301) 215-4500 <a href="http://www.necanet.org/">http://www.necanet.org/</a>
NEII	National Elevator Industry, Inc. 1677 County Route 64 P.O. Box 838 Salem, New York 12865-0838 Tel. 518-854-3100 / Fax. 518-854-3257 <a href="http://www.neii.org/">http://www.neii.org/</a>
NEMA	National Electrical Manufacturers Assoc. 1300 North 17th Street, Suite 1752 Rosslyn, Virginia 22209 Phone: (703) 841-3200 / Fax: (703) 841-5900 <a href="http://www.nema.org/">http://www.nema.org/</a>
NFPA	National Fire Protection Assoc. 1 Batterymarch Park Quincy, Massachusetts USA 02169-7471 Tel: (617) 770-3000 / Fax: +1 617 770-0700 <a href="http://www.nfpa.org/">http://www.nfpa.org/</a>
AF&PA	American Forest & Paper Association (Formerly National Forest Products Association NFPA). 1111 Nineteenth Street, NW, Suite 800 Washington, DC 20036 Phone: 1-800-878-8878, 1-202-463-2700 <a href="http://www.afandpa.org/">http://www.afandpa.org/</a>
NHLA	National Hardwood Lumber Assoc. 6830 Raleigh-LaGrange Road Memphis, TN 38184-0518 (901) 377-1818 <a href="http://www.natlhardwood.org/">http://www.natlhardwood.org/</a>
NLGA	National Lumber Grades Authority #302 – 960 Quayside Drive

New Westminster, BC V3M 6G2 CANADA  
 Tel: (604) 524-2393 / Fax: (604) 524-2893  
<http://www.nlga.org/>

- NPA National Particleboard Assoc.  
 18928 Premiere Court  
 Gaithersburg, MD 20879-1569  
 301/670-0604 FAX 301/840-1252  
<http://www.pbmdf.com/>
- NPCA National Paint and Coatings Assoc.  
 1500 Rhode Island Ave., NW  
 Washington, DC 20005  
 Phone: (202) 462-6272 / Fax: (202) 462-8549  
<http://www.paint.org/index.htm>
- NRCA National Roofing Contractors Assoc.  
 10255 W. Higgins Rd., Suite 600  
 Rosemont, IL 60018 5607  
 Phone (708) 299 9070 / Fax: (847) 299-1183  
<http://www.nrca.net/>
- NTMA National Terrazzo and Mosaic Assoc.  
 201 North Maple, Suite 208  
 Purcellville, VA 20132  
 Phone: 540-751-0930 / 800-323-9736 / Fax: 540-751-0935  
<http://www.ntma.com/>
- NWWDA National Wood Window and Door Assoc.  
 1400 E. Touhy Ave.  
 Des Plaines, IL 60018  
 Tel. (800) 223 2301/ Fax: (708) 299 1286
- PCA Portland Cement Assoc.  
 5420 Old Orchard Road  
 Skokie, IL 60077  
 Phone: (847) 966 6200 / Fax: (847) 966-8389  
<http://www.cement.org/>
- PCI Precast/Prestressed Concrete Institute  
 209 W. Jackson Blvd. #500  
 Chicago, IL 60606  
 Tel. (312) 786 0300 / Fax: 312-786-0353  
<http://www.pci.org/intro.cfm>
- RFCI Resilient Floor Covering Institute  
 401 East Jefferson Street, Suite 102  
 Rockville, Maryland 20850  
 Telephone: 301-340-8580 / Fax: 301-340-7283  
<http://www.rfci.com/index.htm#>
- RMA Rubber Manufacturers Assoc.



1400 K St., NW, Suite 900  
 Washington, DC 20005 (202) 682 4800  
<http://www.rma.org/>

- SDI** Steel Deck Institute  
 P.O. Box 25  
 Fox River Grove, IL 60021  
 phone: 847-458-4647 / fax: 847-458-4648  
<http://www.sdi.org/>
- S.D.I.** Steel Door Institute  
 The Steel Door Institute is managed by: Wherry Associates  
 30200 Detroit Road  
 Cleveland, OH 44145-1967  
 phone: 440.899.0010 / fax: 440.892.1404  
<http://www.steeldoor.org/>
- SECO** State Energy Conservation Office  
 LBJ State Office Building  
 111 E. 17th Street, Room 1114  
 Austin, TX 78701  
 Phone: (512) 463-1931 / FAX: (512) 475-2569  
<http://www.seco.cpa.state.tx.us/>
- SGCC** Safety Glazing Certification Council  
 PO Box 730  
 Sackets Harbor, NY 13685  
 Phone: (315) 646-2234 / (315) 646-2297  
<http://www.sgcc.org/>
- SIGMA** Sealed Insulating Glass Manufacturers Assoc.  
 401 N. Michigan  
 Chicago, IL 60611 (312) 644 6610  
<http://www.sigmaonline.org>
- SJI** Steel Joist Institute  
 3127 Mr. Joe White Avenue  
 Myrtle Beach, SC 29577-6760  
 Phone: (843) 626-1995 / Fax: (843) 626-5565  
<http://www.steeljoist.org/>
- SMACNA** Sheet Metal and Air Conditioning Contractors National Association  
 4201 Lafayette Center Drive  
 Chantilly, Virginia 20151-1209  
 Tel (703) 803-2980 - Fax (703) 803-3732  
<http://www.smacna.org/>
- SPIB** Southern Pine Inspection Bureau  
 P.O. Box 10915  
 Pensacola, Fl. 32524-0915  
 Office: (850) 434-2611 Fax: (850) 433-5594  
<http://www.spib.org/>

SPRI	Single Ply Roofing Institute 77 Rumford Avenue, Suite 3B Waltham, MA 02453 Phone: 781-647-7026 • Fax: 781-647-7222 <a href="http://www.spri.org/">http://www.spri.org/</a>
TCA	Tile Council of America 100 Clemson Research Blvd. Anderson, SC 29625 Phone: 864-646-8453 / Fax: 864-646-2821 <a href="http://www.tileusa.com/profile_main.htm">http://www.tileusa.com/profile_main.htm</a>
TIMA	Thermal Insulation Manufacturers Assoc. 29 Bank Street Stamford, CT 06901 (203) 324 7533 (Standards now issued by NAIMA, <a href="http://www.naima.org/">http://www.naima.org/</a> )
UFAC	Upholstered Furniture Action Council Box 2436 High Point, NC 27261 (919) 885 5065 <a href="http://www.ufac.org/">http://www.ufac.org/</a>
UL	Underwriters Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 USA Phone: 847-272-8800 / Fax: 847-272-8129 <a href="http://www.ul.com/">http://www.ul.com/</a>
WSFI	Wood and Synthetic Flooring Institute 4415 W. Harrison St., Suite 242 C Hillside, IL 60162 (708) 449 2933
WWPA	Western Wood Products Assoc. 522 SW Fifth Ave. Suite 500, Portland, Oregon 97204-2122 Tel: 503-224-3930   Fax: 503-224-3934 <a href="http://www.wwpa.org/">http://www.wwpa.org/</a>
W.W.P.A.	Woven Wire Products Assoc. 2515 N. Nordica Ave. Chicago, IL 60635 (312) 637 1359 <a href="http://www.wovenwire.org/">http://www.wovenwire.org/</a>

#### 1.4 GOVERNMENT AGENCIES

CPSC	Consumer Product Safety Commission 4330 East West Highway Bethesda, MD 20814 General Information: (301) 504-7923 M-F 8:00 am - 4:30 pm ET
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Fax: (301) 504-0124 and (301) 504-0025  
<http://www.epsc.gov/>

- CS Commercial Standard (U.S. Department of Commerce)  
1401 Constitution Ave., NW  
Washington, DC 20230  
Phone: (202) 482-2000  
<http://www.commerce.gov/>
- DOC U.S. Department of Commerce  
1401 Constitution Ave., NW  
Washington, DC 20230  
Phone: (202) 482-2000  
<http://www.commerce.gov/>
- EPA Environmental Protection Agency  
1445 Ross Avenue (maps) Suite 1200  
Dallas, Texas 75202  
(214) 665-6444  
<http://www.epa.gov/>
- FS Federal Specification (from GSA) Specifications Unit (WFSIS)  
7th and D St., SW  
Washington, DC 20407 (202) 708 9205  
<http://apps.fss.gsa.gov/pub/fedspecs/search.cfm>
- GSA General Services Administration  
1800 F Street, NW  
Washington, DC 20405  
(202) 708 5082  
<http://www.gsa.gov/Portal/gsa/ep/home.do?tabId=0>
- GSC Texas Building and Procurement Commission  
1711 San Jacinto  
Austin, TX 78701  
(512) 463-6363  
<http://www.tbpc.state.tx.us/>
- NIST National Institute of Standards and Technology  
100 Bureau Drive, Stop 1070,  
Gaithersburg, MD 20899-1070  
Phone: (301) 975-NIST (6478) or TTY (301) 975-8295  
<http://www.nist.gov/>
- OSHA Occupational Safety and Health Administration  
Federal Office Building  
1205 Texas Avenue, Room 806  
Lubbock, Texas 79401  
Phone: (806) 472-7681 (7685) / Fax: (806) 472-7686  
<http://www.osha.gov/>
- PS Product Standard of NBS (U.S. Department of Commerce)

Washington, DC 20230  
(202) 482 2000  
<http://www.thenbs.com/products/default.asp>

USDA

U.S. Department of Agriculture  
1400 Independence Ave., S.W.  
Washington, DC 20250  
(202) 447 2791  
<http://www.usda.gov/wps/portal/usdahome>

END OF SECTION

Sample

## SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

**PART 1. GENERAL**

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.

## 1.2 PROTECTION OF SITE

- A. Contractor shall furnish measures for protection of the public, workmen and property, including structural engineering, maintenance, and operation of such facilities.

## 1.3 EXECUTION OF WORK

- A. Contractor shall provide measures for executing work related to this project, including, but not limited to, structural engineering, cranes, hoists, chutes, movement of personnel, materials, equipment, temporary heating, and operation and maintenance of such facilities.

## 1.4 EXISTING UNDERGROUND UTILITIES

- A. Existing underground lines occur in the site where the work is to be done. The Contractor shall visit the site and determine the location of all utility lines. Existing lines shown on the drawing are not guaranteed as to size and location or for completeness. Any utility line which interferes with the new construction shall be relocated or rerouted by the Contractor as directed by the Design Professional and Texas Tech. Removal or rerouting of any portion of an existing landscape irrigation system by the Contractor shall be accomplished under the direction of a licensed landscape irrigator and Texas Tech. All salvaged landscape irrigation material shall be delivered to the Department of Grounds Maintenance.

## 1.5 SCAFFOLDING, BARRICADES, ENCLOSURES

- A. The Contractor shall furnish, erect, and maintain for the duration of the work as required, all scaffold, runways, guard rails, platforms and similar temporary construction as may be necessary for the performance of the Contract. Such facilities shall be of type and arrangement as required for their specific use and comply with all applicable laws and regulations of the Occupational Safety and Health Act.
- B. The Contractor shall provide, install, and maintain for the duration of work all necessary solid barricades, warning signs and signals, and shall take all other precautions to safeguard persons, adjoining property, including improvements thereon, against injuries and damages of every nature whatsoever.
- C. Parts and structures and other work in place that are subject to injury because of the operations being carried on adjacent thereto, shall be covered, boarded up or substantially enclosed with adequate protection. This includes but is not limited to existing structures to remain, adjacent existing structures where no work is indicated, existing landscaping features scheduled to remain and existing site features scheduled to remain.
- D. Temporary enclosures, both dust proof and sound treated, shall be provided whenever Texas Tech's existing operation requires such separation from construction dirt and noise.

## 1.6 GUARDRAILS AND BARRICADES

- A. Provide guardrails, handrails, and covers for floor, roof, and wall openings, and for stairways installed or construction by Contractor's forces.

- B. If movement of these protective facilities is required to perform work, it will be the responsibility of the Contractor to replace the said protections in a satisfactory manner.
- C. Provide all barricades required to protect all natural resources and site improvements.

#### 1.7 STAIRS, LADDERS, HOISTS, ETC.

- A. Provide temporary stairs, scaffolding and ladders as may be required for the use of all workmen and inspectors.
- B. Install and operate such material hoists as may be necessary to perform the work properly and expeditiously.

#### 1.8 YARD REPAIRS

- A. Where compaction of the soil has occurred in turf or other plant material areas within the area of construction, the areas shall be rejuvenated by deep cultivation of the compacted soil. After completion of the construction, the Contractor shall scarify the construction site within the established construction limits. Scarifying shall be to a minimum depth of eight (8) to ten (10) inches except within a thirty-foot radius of trees where scarifying shall be a maximum of six (6) inches in depth. The surface shall be roto-tilled to a depth of four (4) to six (6) inches, hand raked to remove any material greater than three-quarter (3/4) inch in diameter, and reshaped to prepare a suitable seedbed. The Contractor shall furnish and install either Bermuda grass sod or Bermuda grass seed to the rejuvenated area, depending on the season. Seeding will be allowed only between May 1<sup>st</sup> - August 1<sup>st</sup>.
- B. Bermuda grass sod shall be supplied by a reputable turf grower and placed the same day of cutting by the supplier. Sod shall be laid solid and thoroughly rolled with a smooth steel roller of sufficient weight to insure a firm, level surface. If necessary, a top dressing of fine, clean, brick sand shall be applied to effect a smooth even finish. Finished grade of grass shall be flush with existing walkways. Contractor shall thoroughly water grass immediately following installation and not less than twice per week until final acceptance.
- C. Bermuda grass seed shall be of 98% purity and 95% germination, applied at the rate of two (2) pounds per 1000 square feet. The seedbed shall be cultivated sufficiently to reduce the soil to a state where the soil particles on the surface are small enough and lie closely enough together to prevent the seed from being covered too deep for optimum germination. The cross-section previously established shall be maintained throughout the process of cultivation and any necessary reshaping shall be done prior to any planting of seed. The seed shall be uniformly distributed over the area. If sowing seed by hand, rather than by mechanical methods, the seed shall be sown in two directions or right angles to each other. If mechanical equipment is used, the seed shall be applied at the specified rate. Distributed grass seed shall be covered lightly by hand raking or by dragging with a brush or mat in two directions. Firm the seeded area with a light empty roller (30 lb.) or cultipacker. When rolling, soil should not be pushed by the roller or scuffed when turning. Seeded areas should be kept moist until well established. Once seeds have begun to germinate they must not be allowed to dry out and die. Avoid saturating the soil, light applications of water should be made several times daily, if necessary, to insure that the top one-half (1/2) inch of soil is moist at all times.

#### 1.9 TEMPORARY FIELD OFFICES

- A. The Contractor shall furnish and maintain during construction of the project, adequate facilities at the site for the use of the Contractor, Owner's Representative and Texas Tech Program Director.
- B. The Prime Contractors and the Subcontractors shall maintain office and storage facilities on the site as may be necessary for the proper conduct of the work. These shall be located so as to cause no interference to any work to be performed on the site. The Program Director shall be consulted with regard to locations.

- C. Upon completion of the project, or as directed by the Program Director, the Contractor shall remove all such temporary structure and facilities from the site and leave the premises in the condition required by the Contract Documents.

#### 1.10 INTERNET CONNECTIVITY

- A. Contractor shall provide, maintain, and pay for internet service for his own use, the Design Professional, and all Subcontractors for the duration of the work.

#### 1.11 PROTECTED STORAGE

- A. Provide on the premises, at locations approved by Texas Tech, suitable substantial watertight, securable storage sheds for storage of tools and all materials which might be damaged if exposed to the weather. Texas Tech will not be responsible for lost or stolen Contractor/subcontractor's tools.
- B. Maintain such buildings in good condition, and remove them when directed.
- C. Raise floors at least six (6) inches above the ground, on heavy joists or sleepers.
- D. Materials: Contractor shall construct temporary facilities of rough or smooth clean lumber as usage requires. Faces exposed to public shall be smooth surfaced, neatly assembled, firmly braced, and painted a minimum of two (2) coats, colors as approved by The Texas Tech Program Director.

#### 1.12 TOILETS

- A. The Contractor shall provide chemical toilet facilities for all workers and shall remove same at completion of the work. Toilets shall be completely enclosed and of neat appearance and shall be located as directed. Toilets are required to be staked down per the Storm Water Pollution Protection Plan for the project.

#### 1.13 SECURITY

- A. Construction security is the responsibility of the Contractor; however, Texas Tech shall have the right of access to the construction site.

#### 1.14 WATCHMAN

- A. The Contractor may, at its option, employ watchman service when work is not being carried on. However, no liability shall be attached to the General Contractor in this respect except in the protection of his own interest.

#### 1.15 CONSTRUCTION FENCE

- A. Shall be a minimum of six foot (6') high chain link fence with steel posts and gates. The fence may be of new or of salvage materials with minimum bracing required for stability. Upon completion of the project the fence and appurtenances shall be removed. The construction fence shall be kept neat and orderly, free from accumulations of trash and weeds.

#### 1.16 TEMPORARY HEAT AND HVAC CONTROLS

- A. Provide temporary heating apparatus and operating fuel as necessary for the proper protection of work. Do not damage work.
- B. The Contractor shall furnish temporary connections to the permanent heating or ventilation system as required to maintain operations of all existing HVAC systems. The Contractor shall maintain functionality of all existing HVAC systems required for all occupied spaces of the construction site. The Contractor shall restore the system to full functionality before turning over to Texas Tech. This shall in no way affect the guarantee period, which shall start at final acceptance of all work.

#### 1.17 TEMPORARY UTILITIES

- A. The Contractor shall arrange for temporary utilities as may be required for the proper execution of the work. The Contractor, at its option, may extend existing water, gas, and electrical services for construction use. The Contractor shall include in his proposal all costs necessary for connecting and extending all necessary utilities. Where connections are made to existing utility services, shut-off or turn-on shall be by Building Maintenance or the designated Physical Plant group only.
- B. Electrical: Contractor shall install a temporary line from an existing power source as directed by the Program Director. Contractor shall provide a temporary fused disconnect switch at the power source and provide ground fault protection for all circuits using portable multi-outlet units designed for construction sites. Upon completion of the project, the Contractor shall remove all temporary installations and restore site to original condition.
- C. Water: Contractor shall install temporary piping and valves necessary to deliver water to construction site. Source of water and pipe route shall be as directed by the Program Director. Provide back flow protection at source of connection satisfactory to Texas Tech's Department of Environmental Health & Safety. Contractor shall arrange with Texas Tech for details of connection to existing source. Upon completion of the project, the Contractor shall remove all temporary installations and restore site to original condition.
- D. Sewers: When necessary provide temporary piping with proper grade to an existing sewer manhole. Connection to a sewer line must be approved by the Program Director. Upon completion of the project, the Contractor shall remove all temporary installations and restore site to original condition.

#### 1.18 PARKING LOT FOR CONSTRUCTION VEHICLES

- A. The Contractor shall maintain parking facilities for construction personnel within the area designated by the construction limits or any other area on campus designated by Texas Tech. Employees of the Contractor, its subcontractors or material suppliers shall park on campus only if space is available.
- B. Requests for construction parking permits may be submitted to Texas Tech. The Contractor/subcontractor will be required to submit vehicle information for verification by Texas Tech. The Contractor/subcontractor will then be issued a Contractor's parking permit from Traffic and Parking.
- C. The Contractor will be permitted a minimum of two (2) parking spaces, adjacent to the construction site. Nothing in this requirement is intended to abrogate the Contractor's regulation of employee parking, service vehicles and construction equipment within the contract limits.
- D. All individuals operating a vehicle on property owned and operated by Texas Tech shall comply with the Traffic and Parking Regulation for Texas Tech.

END OF SECTION



**SECTION 01 56 39 TEMPORARY TREE AND PLANT PROTECTION****PART 1. GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Requirements:
  - 1. Section 01 50 00 "Temporary Facilities and Controls" for temporary site fencing.
  - 2. Section 31 10 00 "Site Clearing" for removing existing trees and shrubs.

**1.3 DEFINITIONS**

- A. I Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size but smaller than 8-inches.
- B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.
- C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings or, if not defined on the Drawings, as defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

**1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site prior to site clearing activities. Allow TTUS FP&C and the component institutions Grounds Maintenance department to review each instance and make adjustments to protection plan as project specific circumstances dictate.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a. The three service firms' personnel, and equipment needed to make progress and avoid delays.
    - b. Arborist's responsibilities.
    - c. Quality-control program.
    - d. Coordination of Work and equipment movement with the locations of protection zones.

- e. Trenching by hand or with air spade within protection zones.
- f. Field quality control.
- g. Other items as applicable for the project.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
  - 2. Detail fabrication and assembly of protection-zone fencing and signage.
  - 3. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
  - 1. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
  - 2. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction. Tree pruning schedule must be approved by the component institution prior to commencement of the Work.
  - 1. Species and size of tree.
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.
- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or video recordings.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

- E. Quality-control program.

## 1.7 QUALITY ASSURANCE

- A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located. Texas Tech University has their own arborists on staff.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborists and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones. Existing trees and plantings not to be removed must be protected, maintained, and cared for throughout the duration of the project.

## 1.8 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
  1. Storage of construction materials, debris, or excavated material.
  2. Moving or parking vehicles or equipment.
  3. Foot traffic.
  4. Erection of sheds or structures.
  5. Impoundment of water.
  6. Excavation or other digging unless otherwise indicated that will disturb the rooting system of the tree or planting material.
  7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

## PART 2. PRODUCTS

### 2.1 MATERIALS

- A. Backfill Soil: Stockpiled native soil from Project site with suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
  1. Mixture: If warranted by arborist, well-blended mix of two parts native stockpiled soil to one part planting soil or fertilizer combination.
  2. Planting Soil: Planting soil as specified in Section 32 91 13 "Soil Preparation".
- B. Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Timberland Hardwood Bark Mulch or Timberland No Float Cypress Blend Mulch. Mulch must be non-combustible.
  2. Size Range: 2 - 3 inches maximum.
  3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting **one of** the following requirements:
1. Wood Protection-Zone Fencing: Constructed of two 2-by-4-inch horizontal rails, with 4-by-4-inch preservative-treated wood posts spaced not more than 96 inches apart, and lower rail set halfway between top rail and ground.
    - a. Height: Minimum 72 inches.
    - b. Lumber: Comply with requirements in Section 06 10 00 Rough Carpentry.
  2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches apart.
    - a. Height: 72 inches.
    - b. Color: High-visibility orange, nonfading.
  3. Gates: If required (for protection zones protecting tree groupings), double-swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches minimum.

### **PART 3. EXECUTION**

#### **3.1 EXAMINATION**

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

#### **3.2 PREPARATION**

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones, if required by Owner, and other areas indicated. Do not exceed indicated thickness of mulch.
  1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

### 3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  - 1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
  - 2. Access Gates: Install as required by Owner; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Maintain protection zones free of weeds and trash.
- C. Maintain protection-zone fencing in good condition as acceptable to Texas Tech and remove when construction operations are complete and equipment has been removed from the site.
  - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 31 20 00 Earth Moving unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

### 3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as directed by Texas Tech as follows:
  - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning

instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.

2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
  3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  4. Cover exposed roots with burlap and water regularly.
  5. Backfill as soon as possible according to requirements in Section 31 20 00 Earth Moving.
- B. Root Pruning at Edge of Protection Zone: Prune tree roots only as directed by Texas Tech. Prune 12 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

### 3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by Texas Tech and arborist.
1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
  2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
  3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
    - a. Type of Pruning: Cleaning, raising, reducing, and thinning where indicated.
- B. Unless otherwise directed by arborist and acceptable to Texas Tech, do not cut tree leaders.
- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.
- E. Provide subsequent maintenance pruning during Contract period as recommended by Texas Tech and arborist.

### 3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

- D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill topsoil in a single uncompacted layer and hand grade to required finish elevations.

### 3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

### 3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
  1. Submit details of proposed pruning and repairs.
  2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
  3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that visibly show to be more than two-thirds dead or in an unhealthy condition or are damaged during construction operations that Texas Tech and the arborist determines are incapable of restoring to normal growth pattern.
  1. Small Trees: Provide new trees of the same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
  2. Large Trees: Provide one new tree of 8 inches caliper size or larger for each tree being replaced that measures greater than 6 inches in caliper size.
    - a. Species: As directed by Texas Tech or, match species being replaced.
  3. Plant and maintain new trees as specified in Section 32 93 00 Plants.
- C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 2-inch uniform thickness to remain.
- D. Soil Aeration: Where directed by Texas Tech or arborist, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch-diameter holes a minimum of 24 inches on center. Backfill holes with an equal mix of augured soil and sand.

### 3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property

END OF SECTION

## SECTION 01 58 13 CONSTRUCTION PROJECT SIGNAGE

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.
- B. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00.
- C. Section 01 58 13A Construction Project Signage Samples.
- D. Texas Tech Signage OP Section 62.22.

#### 1.2 PROJECT SIGNAGE

- A. Construction Project Signage
  - 1. Construction Manager shall install a Project Sign as shown in Section 01 58 13A Construction Project Signage Samples at the site. The exact location of each sign shall be coordinated with Texas Tech.
  - 2. Construction Manager may install one (1) sign bearing the company name and logo indicating the point for delivery for material, supplies, and express deliveries at one gate.
  - 3. Construction Manager shall submit a drawing of the proposed sign, showing its size, content, and location to Texas Tech for approval prior to fabrication.
- B. Temporary Signage
  - 1. Other than the signs above, interior site way finding signage, and signage required for safety, regulatory, and insurance requirements, no other signage will be installed at the Project site. Signs attached to storage and office trailers must be approved by Texas Tech.
- C. Regulatory Signage

### PART 2. PRODUCTS

#### 2.1 SIGNAGE DIMENSIONS AND MATERIALS

- A. Construction project signage shall be constructed of exterior grade  $\frac{3}{4}$ " CDX plywood.
- B. The size shall be 96" in length and 48" in height.
- C. The orientation shall be landscape (horizontal).
- D. The signage surface will be mounted to 4"x4" posts temporarily set in the ground.
- E. The bottom edge of the signage shall be at a minimum 48" above grade and installed level.
- F. All exposed surfaces (sign faces, edges, and posts) shall be weather sealed with white exterior latex paint.
- G. All lettering will be black and follow the Futura font at the character heights indicated in Section 01 58 13A and TTUS OP Section 62.22.
- H. The Texas Tech graphic shall be accented with a red accent line below "Texas Tech".



- I. Texas Tech University System Component Institution Graphics
  1. Texas Tech University System and Texas Tech University
    - a. Texas Tech graphics specifications:
      - i. White
      - ii. Black
      - iii. Red – PMS
      - iv. Gray – PMS
  2. Texas Tech University Health Sciences Center
    - a. Texas Tech graphics specifications:
      - i. White
      - ii. Black
      - iii. Red – PMS
      - iv. Gray – PMS
  3. Texas Tech University Health Sciences Center El Paso
    - a. Texas Tech graphics specifications:
      - i. White
      - ii. Black
      - iii. Red – PMS
      - iv. Gray – PMS
  4. Angelo State University
    - a. Texas Tech graphics specifications:
      - i. White
      - ii. Black
      - iii. Red – PMS
      - iv. Gray – PMS
    - b. Angelo State graphics specifications:
      - i. Blue – PMS
      - ii. Gold. – PMS
  5. Midwestern State University
    - a. Texas Tech graphics specifications:
      - i. White
      - ii. Black

- iii. Red – PMS
- iv. Gray – PMS
- b. Midwestern State graphics specifications:
  - i. Maroon – PMS
  - ii. White. - PMS
- J. Refer to Section 01 58 13A - Construction Project Signage Samples document for specifics.

### **PART 3. EXECUTION**

#### **3.1 INSTALLATION OF TEMPORARY PROJECT SIGNAGE**

- A. Construction project sign shall be installed immediately after the Contract Award.
- B. Construction Manager shall ensure that construction project signage is properly set-back from street intersections and pedestrian walkways such that it does not conflict with or impede fields of view necessary for vehicular and pedestrian traffic circulation.
- C. Construction Manager shall remove construction project signage prior to submission of Construction Manager's Final Application for Payment. Removal of temporary project signage requiring landscape repairs must comply with Section 00 72 00 Texas Tech Uniform General Conditions and Supplementary General Conditions.

#### **3.2 RESPONSIBILITIES**

- A. Construction Manager shall be responsible for maintaining in good condition all temporary construction project signage.
- B. Construction Manager shall ensure that the signage is protected from weather and vandalism and the information is legible and complete at all times during construction.
- C. Construction Manager shall promptly update all outdated sign information as required.

END OF SECTION

## SECTION 01 58 13A CONSTRUCTION PROJECT SIGNAGE SAMPLES



### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Section 01 58 13 Construction Project Signage.



#### 1.2 PROJECT SIGNAGE

- A. Texas Tech University System and Texas Tech University Sample

 <p>14" x 14"</p>	<p>Project Rendering 60" x 24"</p>	 <p>14" height</p>			
<p style="text-align: center;">3.5" <b>PROJECT NAME</b></p> <p style="text-align: center;">2.5" <b>PROJECT BUDGET: \$XX,XXX,XXX</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;"> <b>CONSTRUCTION MANAGER</b> Company Name         </td> <td style="width: 33%; border: none;"> <b>1.5" PROGRAM DIRECTOR</b> PDs Name (806) 742-2116         </td> <td style="width: 33%; border: none;"> <b>DESIGN FIRM</b> Company Name         </td> </tr> </table>			<b>CONSTRUCTION MANAGER</b> Company Name	<b>1.5" PROGRAM DIRECTOR</b> PDs Name (806) 742-2116	<b>DESIGN FIRM</b> Company Name
<b>CONSTRUCTION MANAGER</b> Company Name	<b>1.5" PROGRAM DIRECTOR</b> PDs Name (806) 742-2116	<b>DESIGN FIRM</b> Company Name			



1. Sign Specifications:
  - a. 48" x 96" Exterior Grade Plywood CDX
  - b. White background
  - c. Black lettering in Futura font
  - d. Black, Red, and White Texas Tech Graphics.

## B. Texas Tech University Health Sciences Center Sample

 <p>14" x 14"</p>	<p>Project Rendering 60" x 24"</p>	 <p>14" x 14"</p>
<p>3.5" <b>PROJECT NAME</b></p>		
<p>2.5" <b>PROJECT BUDGET: \$XX,XXX,XXX</b></p>		
<p>CONSTRUCTION MANAGER Company Name</p>	<p>1.5" PROGRAM DIRECTOR PDs Name (806) 742-2116</p>	<p>DESIGN FIRM Company Name</p>



1. Sign Specifications
  - a. 48" x 96" Exterior Grade Plywood CDX
  - b. White background
  - c. Black lettering in Futura font
  - d. Black, Red, and White Texas Tech Graphics.

## C. Texas Tech University Health Sciences Center El Paso Sample

 <p>14" x 14"</p>	<p>Project Rendering 60" x 24"</p>	 <p>14" x 14"</p>
<p>3.5" <b>PROJECT NAME</b></p> <p>2.5" <b>PROJECT BUDGET: \$XX,XXX,XXX</b></p>		
<p>CONSTRUCTION MANAGER Company Name</p>	<p>1.5" PROGRAM DIRECTOR PDs Name (806) 742-2116</p>	<p>DESIGN FIRM Company Name</p>



1. Sign Specifications
  - a. 48" x 96" Exterior Grade Plywood CDX
  - b. White background
  - c. Black lettering in Futura font
  - d. Black, Red, and White Texas Tech Graphics.

## D. Angelo State University Sample

 <p>14" x 14"</p>	<p>Project Rendering 60" x 24"</p>	 <p>14" width</p>
<p>3.5" <b>PROJECT NAME</b></p>		
<p>2.5" <b>PROJECT BUDGET: \$XX,XXX,XXX</b></p>		
<p>CONSTRUCTION MANAGER Company Name</p>	<p>1.5" PROGRAM DIRECTOR PDs Name (806) 742-2116</p>	<p>DESIGN FIRM Company Name</p>

1. Sign Specifications
  - a. 48" x 96" Exterior Grade Plywood CDX
  - b. White background
  - c. Black lettering in Futura font
  - d. Black, Red, and White Texas Tech Graphics
  - e. Blue and Gold Angelo State Graphics

## E. Midwestern State University Sample

 <p>14" x 14"</p>	<p>Project Rendering 60" x 24"</p>	 <p>14" width</p>
<p>3.5" <b>PROJECT NAME</b></p> <p>2.5" <b>PROJECT BUDGET: \$XX,XXX,XXX</b></p>		
<p>CONSTRUCTION MANAGER Company Name</p>	<p>1.5" PROGRAM DIRECTOR PDs Name (806) 742-2116</p>	<p>DESIGN FIRM Company Name</p>

1. Sign Specifications
  - a. 48" x 96" Exterior Grade Plywood CDX
  - b. White background
  - c. Black lettering in Futura font
  - d. Black, Red, and White Texas Tech Graphics
  - e. Maroon and White Midwestern State Graphics.

**PART 2. PRODUCTS (NOT USED)**

**PART 3. EXECUTION (NOT USED)**

END OF SECTION

## SECTION 01 60 00 PRODUCT REQUIREMENTS

### PART 1. PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes 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 01 25 00 Substitution Request Procedures for requests for substitutions.
  - 2. Section 01 42 00 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 by Texas Tech and Architect 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

#### 1.4 ACTION SUBMITTALS



- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Approval of Submittal: As specified in Section 01 33 00 Submittals.
    - b. Use product specified if Architect 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 01 33 00 Submittals. Show compliance with requirements.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If the Construction Manager 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 specified products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Texas Tech will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
  - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.
  - 3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

## 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 the 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. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Construction Manager of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written

document using indicated form properly executed.

3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 Closeout Requirements.

## **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. Materials and products must be new and must be conformance with approved submittals. Texas Tech reserves the right to reject and refuse the use of materials and products that are not in conformance with the approved submittals.
  2. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  3. 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.
  4. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  5. Where products are accompanied by the term "as selected," Texas Tech and Architect will make selection.
  6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
    - a. 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. Submit additional documentation required by Texas Tech and Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by Texas Tech and the Architect, whose determinations are final.
- B. Product Selection Procedures:
  1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for the Contractor's convenience will not be considered.
    - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
  2. Sole 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 the Contractor's convenience will not be considered.
    - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
  3. Limited List of Products: 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 the Contractor's convenience will not be considered.

- a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
  - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
5. Limited List of Manufacturers: 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 by Texas Tech.
  - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
7. 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 Architect's sample," provide a product that complies with requirements and matches Architect's sample. Texas Tech and Architect's decision will be final on whether a proposed product matches.
  1. If no product available within the specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 Substitution Request Procedures for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from a manufacturer's full range" or similar phrase, select a product that complies with requirements. Architects will select color, gloss, pattern, density, or texture from manufacturer's full product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Texas Tech and Architect will consider the Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Texas Tech and Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product presents a delay to the schedule.
  2. Evidence that proposed product is out of stock, has been discontinued, or has been delayed due to manufacturing or fabrication problems.
  3. Evidence that the proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  4. Evidence that proposed product provides specified warranty.
  5. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  6. Samples, if requested.
- B. Submittal Requirements: Approval by Texas Tech and the Architect of Construction Manager's request for use of comparable product does not relieve the contractor of conformance with the comprehensive requirements of the specifications. Comply with specified submittal requirements.

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01 77 00 CLOSE OUT REQUIREMENTS****PART 1. PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Article 12 and 13 of the Uniform General and Supplementary Conditions.
- C. Certificate of Substantial Completion.

## 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final Completion procedures.
  - 3. List of incomplete items from Final Punchlist
  - 4. Submittal of Project Warranties.
- B. Related Requirements:
  - 1. Section 01 29 00 "Payment Procedures" for application for payment at Substantial Completion and Final Payment application submission procedures.
  - 2. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 3. Section 01 78 39 "Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 4. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

## 1.3 ACTION SUBMITTALS

- A. Product Data
- B. Operations and Maintenance manuals for each specified section requiring operational maintenance of materials, equipment, and building systems.
- C. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- D. Certified List of Incomplete Items: Final submittal at final completion.

## 1.4 CLOSE OUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.
- B. Submit manufacturer's cleaning procedures and acceptable cleaning agents/products for each material installed.
- C. Submit unacceptable procedures and list of chemicals or cleaning agents that should not be used on installed materials and products.

## 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: The Construction Manager shall prepare and submit a list of all incomplete items to be completed and corrected (Contractor's punch list) prior to the request for final punch. The list is to indicate the value of each incomplete item and the reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Texas Tech. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
  - 5. Submit all testing, adjusting, and balancing records performed by subcontractors validating the quality of the Work as it was installed.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining the date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner's Lock shop. Advise Owner's personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion, including the replacement of filter media with new filters in all building systems.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training".
  6. Advise Owner of changeover in utility services.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements.
  10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
  11. Remove project sign.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Owner of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Construction Manager of items, either on Construction Manager's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

#### 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to the date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Architect will prepare a final Certificate for Payment after inspection



or will notify the Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Construction Manager that are outside the limits of construction.
  1. Organize list of spaces in sequential order.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Construction Manager and subcontractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:
    - a. MS Excel electronic file. Architect will return annotated file.
    - b. PDF electronic file. Architect will return annotated file.
    - c. Web-based project software upload. Ensure list is uploaded into eBuilder in appropriate subfolder.

#### 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Owner for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  1. Submit by uploading to Texas Tech's web-based project software site, eBuilder.

## **PART 2. PRODUCTS**

### 2.1 MATERIALS

- A. **Cleaning Agents:** Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

### **PART 3. EXECUTION**

#### **3.1 FINAL CLEANING**

- A. **General:** Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. **Cleaning:** Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to buildings.
    - f. Clean exposed exterior and interior hard-surface finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

- n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - i. Clean HVAC system in compliance with [NADCA ACR.] [Section 230130.52 "Existing HVAC Air-Distribution System Cleaning."] Provide written report on completion of cleaning.
  - p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to new condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

**SECTION 01 78 23 OPERATION AND MAINTENANCE DATA****PART 1. GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00.

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals,
  - 2. Emergency manuals,
  - 3. Systems and equipment operation manuals,
  - 4. Systems and equipment maintenance manuals, and
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 33 00 Submittals -for submitting copies of submittals for operation and maintenance manuals.
  - 2. Section 01 91 13 General Commissioning Requirements - for verification and compilation of data into operation and maintenance manuals.

**1.3 DEFINITIONS**

- A. Close Out Documents: Refer to Section 00 72 00 Texas Tech Uniform General and Supplementary General Conditions, Article 1. Definitions.
- B. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- C. Subsystem: A portion of a system with characteristics similar to a system

**1.4 PROJECT CLOSEOUT SUBMITTALS**

- A. Submit operation and maintenance (O&M) manuals for all specified building systems. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Design Professional will comment on whether content of operation and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
  - 1. Submit by uploading into eBuilder to the location indicated by TTUS FP&C.

- C. Draft Manual Submittal: Submit draft copy of each manual at least thirty (30) days before commencing demonstration and training. Design Professional will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Design Professional will return copy with comments.
  - 1. Correct or revise each manual to comply with Design Professional's comments. Submit copies of each corrected manual before Final Completion
- E. Comply with Section 01 77 00 Closeout Requirements regarding schedule for submitting operation and maintenance documentation.

#### 1.5 GENERAL COORDINATION PROCEDURES

- A. Electronic Files: Submit electronic files in the form of multiple-page composite electronic true PDF (i.e., searchable) files from manufacturer's literature for each operational system and as required under the specifications.
  - 1. Electronic Files: Use electronic files prepared by the manufacturer.
  - 2. File Names and Bookmarks:
    - a. Bookmark individual documents based on CSI specification number and name.
    - b. Name document files to correspond to CSI specification number and name.
    - c. Group documents for each system and subsystem under CSI Division as specified in Project Manual and into individual composite bookmarked files.
    - d. Create composite manual so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree.
    - e. Configure electronic manual to display bookmark panel on opening file

#### 1.6 COORDINATION DRAWINGS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page,
  - 2. Table of contents, and
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual,
  - 2. Name and address of Project,
  - 3. Name and address of Owner,
  - 4. Date of submittal,
  - 5. Name and contact information for Contractor,
  - 6. Name and contact information for Construction Manager,

7. Name and contact information for Architect,
  8. Name and contact information for Commissioning Authority,
  9. Names and contact information for major consultants to Architect that designed the systems contained in the manuals, and
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual:
1. Identify by product name,
  2. Indexed to the content of the volume, and
  3. Cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents:
1. Organize electronic files to manageable size.
  2. Arrange contents alphabetically by system, subsystem, and equipment.
  3. If possible, assemble instructions for subsystems, equipment, and components of one system into a single compiled true (searchable) PDF file.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, Preparation of Operating and Maintenance Documentation for Building Systems.

#### 1.7 FORMAT FOR EQUIPMENT OPERATION MANUALS

- A. Equipment Operation Manual: Assemble a complete set of data indicating the operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions,
    - a. Use designations for systems and equipment indicated in Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility,
  3. Operating standards,
  4. Operating procedures,
  5. Operating logs,
  6. Wiring diagrams,
  7. Control diagrams,

8. Piped system diagrams,
  9. Precautions against improper use, and
  10. License requirements, including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number,
    - a. Use designations for products indicated in Contract Documents.
  2. Manufacturer's name,
  3. Equipment identification with serial number of each component,
  4. Equipment function,
  5. Operating characteristics,
  6. Limiting conditions,
  7. Performance curves
  8. Engineering data and tests, and
  9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures,
  2. Equipment or system break-in procedures,
  3. Routine and normal operating instructions,
  4. Regulation and control procedures,
  5. Instructions on stopping,
  6. Normal shutdown instructions,
  7. Seasonal and weekend operating instructions,
  8. Required sequences for electric or electronic systems, and
  9. Special operating instructions and procedures.
- E. Equipment Controls: Describe the sequence of operation and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

## 1.8 REQUIREMENTS FOR EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  2. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

3. Prepare a separate manual for each system and subsystem in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information:
1. List each system, subsystem, and piece of equipment included in manual, identified by product name, and arranged to match manual's table of contents.
  2. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins include only sheets pertinent to product or component installed.
  2. Mark each sheet to identify each product or component incorporated into the Work.
    - a. If data includes more than one (1) item in a tabular format, identify each item using appropriate references from Contract Documents.
    - b. Identify data applicable to the Work and delete references to information not applicable.
    - c. Prepare supplementary text if manufacturers' standard printed data is not available and location of the information necessary for proper operation and maintenance of equipment or systems.
  3. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  4. Identification and nomenclature of parts and components.
  5. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions,
  2. Troubleshooting guide,
  3. Precautions against improper maintenance,
  4. Disassembly, component removal, repair, and replacement, and reassembly instructions,
  5. Aligning, adjusting, and checking instructions, and
  6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly,



semiannual, and annual frequencies.

2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: If required by the specifications, include copies of maintenance agreements with the name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
  1. Do not use original Project record documents as part of maintenance manuals.

#### 1.9 MATERIAL MAINTENANCE AND CLEANING MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
  1. Product name and model number,
  2. Manufacturer's name,
  3. Color, pattern, and texture,
  4. Material and chemical composition, and
  5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  1. Inspection procedures,
  2. Types of cleaning agents to be used and methods of cleaning,
  3. List of cleaning agents and methods of cleaning detrimental to product,
  4. Schedule for routine cleaning and maintenance, and
  5. Repair instructions.

- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties.
  - 1. Include procedures to follow and required notifications for warranty claims.

**PART 2. PRODUCTS (NOT USED)**

**PART 3. EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01 78 39 PROJECT RECORD DOCUMENTS****PART 1. GENERAL**

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00 Article 1.
- C. Texas Tech Uniform General and Supplementary General Conditions Section 00 72 00 Article 6.

## 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
- B. Related Requirements:
  - 1. Section 01 77 00 Close Out Requirements - for general close out procedures.
  - 2. Section 01 78 23 Operation and Maintenance Data - for operation and maintenance manual requirements.

## 1.3 PROJECT CLOSE OUT SUBMITTALS

- A. Project Record Drawings (As-Built): Comply with the following:
  - 1. Submit one (1) set(s) of Project specific Record Drawings indicating all conditions deviating from Contract Documents.
  - 2. Number of Copies: Submit copies of Record Drawings As-Built as follows:
    - a. Initial Submittal:
      - i. Submit PDF electronic files of scanned Record Document As-Built immediately upon completion of each phase of the completed Work.
        - 1) Provide a clear date of submission on As-Built documents.
        - 2) Do not wait until the end of the Project to submit.
    - b. Final Submittal:
      - i. Submit PDF electronic file of scanned Record Document As-Built for entire installation, inclusive of all revisions and adjustments made through the construction process, immediately upon completion of the Work in its entirety.
        - 1) Provide a clear date of submission on As-Built documents.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including Addenda and Contract modifications.
- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit

annotated PDF electronic files and directories of each submittal.

#### 1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one (1) set of marked-up paper or PDF copies of Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show actual installation where installation varies from that shown originally. Require individual or entity who obtained Record Data to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings,
    - b. Revisions to details shown on Drawings,
    - c. Depths of foundations or elements deviating from design intent,
    - d. Locations and depths of underground utilities,
    - e. Revisions to routing of piping and conduits,
    - f. Revisions to electrical circuitry,
    - g. Actual equipment locations,
    - h. Duct size and routing,
    - i. Locations of concealed internal utilities,
    - j. Changes made by Addenda, ASI's, RFI's, Construction Change Requests, Change Order or Construction Change Directive,
    - k. Changes made following Design Professional's written orders,
      - l. Details not on the original Contract Drawings,
    - m. Field records for variable and concealed conditions, and
    - n. Record information on the Work that is shown only schematically.
  3. Mark Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record set changes in red in PDF.
    - a. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record files with Design Professional. The Design Professional, when authorized, is to prepare a full set of corrected digital data files of Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
  2. Format: .DWG, .RVT digital files for Microsoft Windows operating system.
  3. Format: Annotated PDF electronic files.
  4. Incorporate changes and additional information previously marked on Project Record Document (As-Builts) as provided by Construction Manager. Delete, redraw, and add details and notations where applicable.
  5. Refer instances of uncertainty to Construction Manager for resolution.
  6. Design Professional will furnish Texas Tech with one (1) set of digital data files of Contract Drawings for use in recording information.
    - a. Refer to Section 01 31 00 Project Management and Coordination for requirements related to use of Design Professional's digital data files.
    - b. Design Professional will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING (As-Builts)" in a prominent location.
1. Record Prints: Organize electronic record files into manageable sets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of Contract Drawings.
    - a. Name each file with the sheet identification.
    - b. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name,
    - b. Date,
    - c. Designation "PROJECT RECORD DRAWINGS (As-Builts),
    - d. Name of Design Professional, and
    - e. Name of Construction Manager.

## 1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, Addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Addenda, ASI's, RFI's, Construction Change Requests, Change Orders, final Specifications, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

#### 1.6 RECORD PRODUCT DATA

A. Recording: Maintain each submittal during the construction period for Project Record Document purposes.

1. Post changes and revisions to Project Record Documents as they occur.
2. Do not wait until the end of Project to record.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to the Project site and changes in manufacturer's written instructions for installation.
3. Note related Addenda, ASI's, RFI's, Construction Change Requests, Change Orders, final Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

#### 1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

#### 1.8 MAINTENANCE OF PROJECT RECORD DOCUMENTS (AS-BUILTS)

A. Maintenance of Record Documents: Store Record Documents in the field office apart from Contract Documents used for construction.

1. Do not use Project Record Documents for construction purposes.

2. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss.
3. Provide access to Project Record Documents for Design Professional's reference during normal working hours.

**PART 2. PRODUCTS (NOT USED)**

**PART 3. EXECUTION (NOT USED)**

END OF SECTION

Sample

## SECTION 01 79 00 DEMONSTRATION AND TRAINING

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
  - 2. Demonstration and training video recordings.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For specialty technician with the relevant expertise that is authorized by the manufacturer to provide proficient training on the use, cleaning, and maintenance of materials, products, and building systems.
- C. Attendance Record: For each training module, submit a list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings and Documentation: Submit (upload in eBuilder) electronic video files and PDFs within seven (7) days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Date of video recording.



2. Transcript: Prepared in PDF electronic format. Include a cover sheet with the same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

#### 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: An employee of the manufacturer or installer experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Specialty Technician Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training of the material or building system.
- C. Videographer Qualifications: A videographer who is experienced photographing and videoing demonstration and training events similar to those required.
- D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of demonstration and training.
  4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

#### 1.6 COORDINATION

- A. Coordinate demonstration and training instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by the Design Professional.

#### 1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop a demonstration and training instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each

module, include instruction for the following as applicable to the system, equipment, or component:

1. Operational Requirements and Criteria: Include the following:
  - a. System, subsystem, and equipment descriptions.
  - b. Performance criteria.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Systems and equipment operation manuals.
  - c. Systems and equipment maintenance manuals.
  - d. Product maintenance manuals.
  - e. Project Record Documents.
  - f. Identification systems.
  - g. Warranties and bonds.
  - h. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.

- e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning.
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## 1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."
- B. Set up instructional equipment at the instructional location.

#### 1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified specialty technicians to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment.
  - 1. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 2. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
  - 1. Schedule training with Owner through Construction Manager, with at least fourteen days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

#### 1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
  - 1. Submit video recordings by uploading to web-based Project software site, eBuilder.
  - 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

- a. Name of Contractor/Installer.
  - b. Business address.
  - c. Business phone number.
  - d. Point of contact.
  - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming, and pause the training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.
- E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- F. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

## **PART 2. PRODUCTS**

## **PART 3. EXECUTION**

END OF SECTION

## SECTION 01 91 13 PROJECT COMMISSIONING REQUIREMENTS

### PART 1. GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Third-Party Commissioning Agent Commissioning Plan to be provided for reference.

#### 1.2 SUMMARY

##### A. Section Includes:

1. General requirements for coordinating and scheduling commissioning activities.
2. Commissioning meetings.
3. Commissioning reports.
4. Use of commissioning process test equipment, instrumentation, and tools.
5. Construction checklists, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
6. Commissioning tests and commissioning test demonstrations.
7. Adjusting, verifying, and documenting identified systems and assemblies.

##### B. Related Requirements:

1. Section 01 33 00 "Submittals" for submittal procedure requirements for commissioning process.
2. Section 01 77 00 "Close Out Procedures" for Certificate of Construction-Phase Commissioning Process Completion submittal requirements.
3. Section 01 78 23 "Operation and Maintenance Data" for preliminary operation and maintenance data submittal requirements.
4. Section 22 08 00 "Commissioning of Plumbing" for technical commissioning requirements for plumbing.
5. Section 23 08 00 "Commissioning of HVAC" for technical commissioning requirements for HVAC.
6. Section 26 08 00 "Commissioning of Electrical Systems" for technical commissioning requirements for electrical systems.
7. Section 27 08 00 "Commissioning of Communications" for technical commissioning requirements for communications systems.
8. Section 28 08 00 "Commissioning of Electronic Safety and Security" for technical commissioning requirements for electronic safety and security systems.

#### 1.3 DEFINITIONS

- A. **Acceptance Criteria:** Threshold of acceptable work quality or performance specified for a commissioning activity, including, but not limited to, construction checklists, performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.
- B. **Basis-of-Design Document:** A document prepared by the Design Professional describing the design intent for the project's designed building systems inclusive of concepts, calculations, decisions, and product selections, in compliance and conformance with applicable regulatory requirements, building codes, Texas Tech's Design and Construction Standards, and relevant guidelines.
- C. **Commissioning Agent:** An entity engaged by Texas Tech to evaluate building systems design intent for the project and execute full commissioning, testing, adjusting, and balancing of the building systems in conformance with the design intent and Contract Documents.
- D. **Commissioning Plan:** A document, prepared by the Owner's Commissioning Agent, that outlines the organization, schedule, allocation of resources, testing procedures, and documentation of the project's commissioning requirements.
- E. **Commissioning:** A quality-focused process for verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, and tested to comply with Texas Tech project specific requirements. The requirements specified here are limited to the construction phase commissioning activities. The scope of the commissioning process is defined in the Commissioning Plan.
- F. **Construction Phase Commissioning Process Completion:** The stage of completion and acceptance of commissioning process when resolution of deficient conditions and issues discovered during commissioning process and retesting until acceptable results are obtained has been accomplished. Owner will establish in writing the date construction-phase commissioning-process completion is achieved. See Section 01 77 00 "Closeout Procedures" for Certificate of Construction Phase Commissioning Process Completion submittal requirements.
  - 1. Commissioning process is complete when the Work specified of this Section and related Sections has been completed and accepted, including, but not limited to, the following:
    - a. Completion of tests and acceptance of test results.
    - b. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
    - c. Comply with requirements in Section 01 79 00 "Demonstration and Training."
    - d. Completion and acceptance of submittals and reports.
- G. **Owner's Project Requirements:** A document that details the functional requirements of a project and the expectations of how it will be used and operated, including Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. This document is prepared either by the Owner or for the Owner by the Design Professional or Owner's Commissioning Agent.
- H. **Owner's Witness:** Owner's designated field construction observer(s), Commissioning Agent, Owner's Program Director, or Design Professional authorized to authenticate test demonstration data and to sign completed test data forms.
- I. **Construction Manger Agent:** Owner's third-party project administrator. TTUS FP&C project may or may not include a Construction Manager Agent.
- J. **"Systems," "Assemblies," "Subsystems," "Equipment," and "Components":** Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment,

and components.

- K. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.
- L. Sampling Procedures and Tables for Inspection by Attributes: As defined in ASQ Z1.4.

#### 1.4 COMMISSIONING TEAM

- A. Members Appointed by Construction Manager:
  1. Commissioning Coordinator: A person or entity employed by the Construction Manager to manage, schedule, and coordinate the commissioning process.
  2. Project superintendent and other employees that Construction Manager may deem appropriate for a particular portion of the commissioning process.
  3. Subcontractors, installers, suppliers, and specialists that Construction Manager may deem appropriate for a particular portion of the commissioning process.
  4. Appointed team members shall have the authority to act on behalf of the entity they represent.
- B. Members Appointed by Owner:
  1. Commissioning Agent, plus consultants that Commissioning Agent may deem appropriate for a particular portion of the commissioning process.
  2. Owner representative(s), field construction observers, Construction Manager Agent, facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning process.
  3. Design Professional, plus employees and consultants that Design Professional may deem appropriate for a particular portion of the commissioning process.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Comply with requirements in Section 01 33 00 "Submittal Procedures" for submittal procedure general requirements for commissioning process.
- B. Commissioning Plan Information:
  1. List of Construction Manager appointed commissioning team members to include specific personnel and subcontractors performing the various commissioning requirements.
  2. Schedule of commissioning activities, integrated with the Construction Schedule. Comply with requirements in Section 01 32 00 "Construction Progress Documentation" for the Construction Schedule general requirements for commissioning process.
  3. Construction Manager personnel and subcontractors participating in each test.
  4. List of instrumentation required for each test to include identification of parties that will provide instrumentation for each test.
- C. Commissioning schedule.
- D. Six-week look-ahead schedules.
- E. Commissioning Coordinator Letter of Authority:



1. Within ten (10) days after approval of Commissioning Coordinator qualifications, submit a letter of authority for the Commissioning Coordinator, signed by a principal of Construction Manager's firm. Letter shall authorize Commissioning Coordinator to do the following:
  - a. Make inspections required for commissioning process.
  - b. Coordinate, schedule, and manage commissioning process of Construction Manager, subcontractors, and suppliers.
  - c. Obtain documentation required for commissioning process from Construction Manager, subcontractors, and suppliers.
  - d. Report issues, delayed resolution of issues, schedule conflicts, and lack of cooperation or expertise on the part of members of the commissioning team.
- F. Commissioning Coordinator Qualification Data: For entity coordinating Construction Manager's commissioning activities to demonstrate their capabilities and experience.
  1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of seven (7) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- G. List test instrumentation, equipment, and monitoring devices. Include the following information:
  1. Make, model, serial number, and application for each instrument, equipment, and monitoring device.
  2. Brief description of intended use.
  3. Calibration record showing the following:
    - a. Calibration agency, including name and contact information.
    - b. Last date of calibration.
    - c. Range of values for which calibration is valid.
    - d. Certification of accuracy.
    - e. Certification for calibration equipment traceable to NIST.
    - f. Due date of the next calibration.
- H. Test Reports:
  1. Pre-Startup Report: Prior to startup of equipment or a system, submit signed, completed construction checklists.
  2. Test Data Reports: At the end of each day in which tests are conducted, submit test data for tests performed.
  3. Commissioning Issue Reports: Daily, at the end of each day in which tests are conducted, submit commissioning issue reports for tests for which acceptable results were not achieved.
  4. Weekly Progress Report: Weekly, at the end of each week in which tests are conducted, submit a progress report.
  5. Data Trend Logs: Submit data trend logs at the end of the trend log period.

- I. System Alarm Logs: Daily, at the start of days following a day in which tests were performed, submit printout of log of alarms that occurred since the last log was printed.
  1. Construction Checklists:
    - a. Material checks.
    - b. Installation checks.
    - c. Startup procedures, where required.

## 1.6 CLOSE OUT SUBMITTALS

### A. Commissioning Report:

1. At Construction Phase Commissioning Completion, include the following:
  - a. Pre-startup reports.
  - b. Approved test procedures.
  - c. Test data forms completed and signed.
  - d. Progress reports.
  - e. Commissioning issue report log.
  - f. Commissioning issue reports showing resolution of issues.
  - g. Correspondence or other documents related to resolution of issues.
  - h. Other reports required by commissioning process.
  - i. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction Phase Commissioning Completion.
  - j. Report shall include commissioning work of Construction Manager.

### B. Request for Certificate of Construction Phase Commissioning Process Completion.

### C. Operation and Maintenance Data: For proprietary test equipment, instrumentation, and tools to include in operation and maintenance manuals.

## 1.7 QUALITY ASSURANCE

### A. Commissioning Coordinator Qualifications:

1. Documented experience commissioning systems of similar complexity to those contained in these documents on at least five (5) projects of similar scope and complexity.

## **PART 2. PRODUCTS**

### 2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

- A. Test equipment and instrumentation required to perform commissioning process shall comply with the following criteria:
  1. Be manufactured for the purpose of testing and measuring tests for which they are being used and have an accuracy to test and measure system performance within the tolerances required to determine acceptable performance.

2. Calibrated and certified.
  - a. Calibration performed and documented by a qualified calibration agency according to national standards applicable to the tools and instrumentation being calibrated. Calibration shall be current according to national standards or within test equipment and instrumentation manufacturer's recommended intervals, whichever is more frequent, but not less than within six months of initial use on Project. Calibration tags shall be permanently affixed.
  - b. Repair and recalibrate test equipment and instrumentation if dismantled, dropped, or damaged since last calibrated.
3. Maintain test equipment and instrumentation.
4. Use test equipment and instrumentation only for testing or monitoring Work for which they are designed.

## 2.2 PROPRIETARY TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

- A. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate, or perform work on its equipment.
  1. Identify proprietary test equipment, instrumentation, and tools required in the test equipment identification list submittal.
  2. Proprietary test equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

## 2.3 REPORT FORMAT AND ORGANIZATION

- A. General Format and Organization:
  1. Electronic Data: Portable document format (PDF); a single file with outline-organized bookmarks for major and minor tabs and tab contents itemized for specific reports.
  2. Upload into Texas Tech's web-based software platform, eBuilder, as directed by Owner.
- B. Commissioning Report:
  1. Include a table of contents and an index to each test.
  2. Include major tabs for each specification section.
  3. Include minor tabs for each test.
  4. Within each minor tab, include the following:
    - a. Test specification.
    - b. Pre-startup reports.
    - c. Approved test procedures.
    - d. Test data forms completed and signed.
    - e. Corrective Action Reports (CAR) showing resolution of issues, and documentation related to resolution of issues pertaining to inspections and functional and operational testing. Group data forms and CAR logs showing resolution of issues, and

documentation related to resolution of issues for each test repetition together within the minor tab, in reverse chronological order (most recent on top).

### **PART 3. EXECUTION**

#### **3.1 PREPARATION**

- A. Review preliminary construction checklists and preliminary test procedures and data forms.

#### **3.2 CONSTRUCTION CHECKLISTS**

- A. Construction checklists cannot modify or conflict with the Contract Documents.
- B. Create construction checklists based on actual systems and equipment to be included in Project.
- C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment if applicable.
  1. Service connection requirements, including configuration, size, location, and other pertinent characteristics.
  2. Included optional features.
  3. Delivery Receipt Check: Construction Manager to inspect and record physical condition of materials and equipment on delivery to Project site, including agreement with approved submittals, cleanliness, and lack of damage.
  4. Installation Checks:
    - a. Location according to Drawings and approved Shop Drawings.
    - b. Configuration.
    - c. Compliance with manufacturers' written installation instructions.
    - d. Attachment to structure.
    - e. Access clearance to allow for maintenance, service, repair, removal, and replacement without the need to disassemble or remove other equipment or building elements. Access coordinated with other building elements and equipment, including, but not limited to, ceiling and wall access panels, in a manner consistent with OSHA fall-protection regulations and safe work practices.
    - f. Utility connections are of the correct characteristics, as applicable.
    - g. Correct labeling and identification.
    - h. Startup Checks: Verify system readiness of equipment to be energized. Include manufacturer's standard startup procedures and forms.
- D. Startup: Perform and document initial operation of equipment to prove that it is installed properly and operates as intended according to manufacturer's standard startup procedures, at minimum.
- E. Performance Tests:
  1. Static Tests: As specified elsewhere, including, but not limited to, duct and pipe leakage tests, insulation-resistance tests, and water-penetration tests.
  2. Component Performance Tests: Tests evaluate the performance of an input or output of

- components under a full range of operating conditions.
3. Equipment and Assembly Performance Tests: Test and evaluate performance of equipment and assemblies under a full range of operating conditions and loads.
  4. System Performance Tests: Test and evaluate performance of systems under a full range of operating conditions and loads.
  5. Intersystem Performance Tests: Test and evaluate the interface of different systems under a full range of operating conditions and loads.
- F. Deferred Construction Checklists: Obtain Owner approval of proposed deferral of construction checklists, including proposed schedule of completion of each deferred construction checklist, before submitting request for Certificate of Construction Phase Commissioning Process Completion. When approved, deferred construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in a request for Certificate of Construction Phase Commissioning Process Completion:
1. Identify deferred construction checklists by number and title.
  2. Provide a target schedule for completion of deferred construction checklists.
  3. Written approval of proposed deferred construction checklists, including approved schedule of completion of each deferred construction checklist.
- G. Delayed Construction Checklists: Obtain Owner approval of proposed delayed construction checklists, including proposed schedule of completion of each delayed construction checklist, before submitting request for Certificate of Construction Phase Commissioning Process Completion. When approved, delayed construction checklists may be completed after date of Construction Phase Commissioning Completion. Include the following in a request for Certificate of Construction-Phase Commissioning Process Completion:
1. Identify delayed construction checklist by construction checklist number and title.
  2. Provide a target schedule for completion of delayed construction checklists.
  3. Written approval of proposed delayed construction checklists, including approved schedule of completion of each delayed construction checklist.

### 3.3 GENERAL EXECUTION REQUIREMENTS

- A. Schedule and coordinate commissioning process with the Construction Schedule.
- B. Perform activities identified in construction checklists, including tests, and document results of actions as construction proceeds.
- C. Perform test demonstrations for Owner's Witness. Unless otherwise indicated, demonstrate tests for 100 percent of work to which the test applies.
- D. Report test data and commissioning issue resolutions.
- E. Schedule personnel to participate in and perform Commissioning process Work.
- F. Installing contractors' commissioning responsibilities include, but are not limited to, the following:
  1. Providing accurate, pre-functional information for building systems equipment from which the Commissioning Plan will be developed and structured.

2. Operating the equipment and systems they install during tests.
3. Correcting and adjusting installed equipment to meet design intent and sequence of operations.
4. Providing additional necessary parts, pieces, equipment, and connectivity to make equipment operate and function to meet design intent and sequence of operations.
5. In addition, installing contractors may be required to assist in tests of equipment and systems with which their work interfaces.

#### 3.4 COMMISSIONING COORDINATOR RESPONSIBILITIES

- A. Management and Coordination: Manage, schedule, and coordinate commissioning process, including, but not limited to, the following:
  1. Coordinate with subcontractors on their commissioning responsibilities and activities.
  2. Obtain, assemble, and submit commissioning documentation.
  3. Attend on-site commissioning meetings. Comply with requirements in Section 01 31 00 "Project Management and Coordination."
  4. Integrate commissioning schedule into the Construction Schedule. Update Construction Schedule at specified intervals and adequately advise with advanced notice the Owner's Commissioning Agent as to when scheduled construction activities requiring commissioning have slipped or are delayed.
  5. Review and comment on preliminary test procedures and data forms.
  6. Report inconsistencies and issues in system operations.
  7. Verify that tests have been completed and results comply with acceptance criteria, and that equipment and systems are ready before scheduling test demonstrations.
  8. Direct and coordinate test demonstrations.
  9. Coordinate witnessing of test demonstrations by Owner's field construction observers and Commissioning Agent.
  10. Coordinate and manage training. Be present during training sessions to direct video recording, present training, and direct the training presentations of others. Comply with requirements in Section 01 79 00 "Demonstration and Training."
  11. Prepare and submit specified commissioning reports.
  12. Track commissioning issues until resolution and retesting is successfully completed.
  13. Retain original records of Commissioning process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.
  14. Assemble and submit commissioning report.

#### 3.5 COMMISSIONING TESTING

- A. Quality Control: Construction checklists, including tests, are quality-control tools designed to improve the functional quality of Project. Test demonstrations evaluate the effectiveness of the Construction Manager's quality control processes.
- B. Owner's witness will be present to witness commissioning work requiring the signature of an owner's field construction observers, including, but not limited to, test demonstrations. Owner's

Program Director will coordinate attendance by Owner's field construction observers with Construction Manager's published Commissioning Schedule. Owner's field construction observers will provide no labor or materials in the commissioning work. The only function of Owner's field construction observers will be to observe and comment on the progress and results of commissioning process.

- C. Construction Checklists:
1. Complete construction checklists as Work is completed.
  2. Distribute construction checklists to installation contractors before they start work.
  3. Installers:
    - a. Verify installation using approved construction checklists as Work proceeds.
    - b. Complete and sign construction checklists weekly for work performed during the preceding week.
  4. Provide Commissioning Agent access to Construction Manger's construction checklists.
- D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.
- E. Pre-Startup Audit: Prior to executing startup procedures, review completed installation checks to determine readiness for startup and operation. Report conditions, which, if left uncorrected, adversely impact the ability of systems or equipment to operate satisfactorily or to comply with acceptance criteria. Prepare pre-startup report for each system.
- F. Test Procedures and Test Data Forms:
1. Test procedures shall define the step-by-step procedures to be used to execute tests and test demonstrations.
  2. Test procedures shall be specific to the make, model, and application of the equipment and systems being tested.
  3. Completed test data forms are the official records of the test results.
  4. Commissioning Agent will provide Construction Manager preliminary test procedures and test data forms for performance tests and commissioning tests after approval of Product Data, Shop Drawings, and preliminary operation and maintenance manual.
  5. Review preliminary test procedures and test data forms and provide comments within fourteen (14) days of receipt from Commissioning Agent. Review shall address the following:
    - a. Equipment protection and warranty issues, including, but not limited to, manufacturers' installation and startup recommendations, and operation and maintenance instructions.
    - b. Applicability of the procedure to the specific software, equipment, and systems approved for installation.
  6. After the Construction Manager has reviewed and commented on the preliminary test procedures and test data forms, Commissioning Agent will revise and reissue the approved revised test procedures and test data forms marked "Approved for Testing."

7. Use only approved test procedures and test data forms marked "Approved for Testing" to perform and document tests and test demonstrations.

G. Functional Performance Testing:

1. The sampling rate for tests is 100 percent. The sampling rate for test demonstrations is 100 percent unless otherwise indicated.
2. Perform and complete each step of the approved test procedures in the order listed.
3. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.
4. Record test results that are not within the range of acceptable results on commissioning issue report forms in addition to recording the results on approved test procedures and data forms according to the "Commissioning Compliance Issues" Paragraph in this Article.
5. On completion of a test, sign the completed test procedure and data form. Tests for which test procedures and data forms are incomplete, not signed, or which indicate performance that does not comply with acceptance criteria will be rejected. Tests for which test procedures and data forms are rejected shall be repeated and results resubmitted.

H. Performance of Test Demonstration:

1. Perform test demonstrations on a sample of tests after test data submittals are approved. The sampling rate for test demonstrations shall be 100 percent unless otherwise indicated in the individual test specification.
2. Notify Owner's field construction observer and Commissioning Agent minimum seven days in advance of each test demonstration.
3. Perform and complete each step of the approved test procedures in the order listed.
4. Record data observed during performance of test demonstrations on approved data forms at the time of demonstration and when the results are observed.
5. Provide full access to Owner's field construction observer and Commissioning Agent to directly observe the performance of all aspects of system response during the test demonstration. On completion of a test demonstration, sign the completed data form and obtain signature of Owner's field construction observer and Commissioning Agent at the time of the test to authenticate the reported results.
6. Test demonstration data forms not signed by Construction Manager and field construction observer at the time of the completion of the test procedure will be rejected. Test demonstrations for which data forms are rejected shall be repeated and results shall be resubmitted.
7. False load test requirements are specified in related sections.
  - a. Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves, and other necessary equipment and connections required to apply the specified load to the system. False load system shall be capable of steady-state operation and modulation at the level of load specified. Equipment and systems permanently installed in this work shall not be used to create the false load without Design Professional's written approval.

I. Deferred Tests:



1. Deferred Test List: Identify, in the request for Certificate of Construction-Phase Commissioning Process Completion, proposed deferred tests or other tests approved for deferral until specified seasonal or other conditions are available. When approved, deferred tests may be completed after the date of Construction-Phase Commissioning Completion. Identify proposed deferred tests in the request for Certificate of Construction-Phase Commissioning Process Completion as follows:
  - a. Identify deferred tests by number and title.
  - b. Provide a target schedule for completion of deferred tests.
2. Schedule and coordinate deferred tests. Schedule deferred tests when specified conditions are available. Notify Design Professional and Commissioning Agent at least seven working days (minimum) in advance of tests.
3. Where deferred tests are specified, coordinate participation of necessary personnel and of Design Professional, Commissioning Authority, and Owner's witness. Schedule deferred tests to minimize occupant and facility impact. Obtain Design Professional's approval of the proposed schedule.

J. Delayed Tests:

1. Delayed Test List: Identify proposed delayed tests. Obtain Owner approval of proposed delayed tests, including proposed schedule of completion of each delayed test, before submitting request for construction phase commissioning completion. Include the following in the request:
  - a. Identify delayed tests by test number and title.
  - b. Written approval of proposed delayed tests, including approved schedule of completion of delayed tests.
2. Schedule and coordinate delayed tests. Schedule delayed tests when conditions that caused the delay have been rectified. Notify Design Professional and Owner's field construction observer and Commissioning Agent at least seven days (minimum) in advance of tests.
3. Where delayed tests are approved, coordinate participation of necessary personnel of Design Professional, Owner's field construction observer and Commissioning Agent. Schedule delayed tests to minimize occupant and facility impact. Obtain Owner's approval of the proposed schedule.

K. Commissioning Compliance Issues:

1. Test results that are not within the range of acceptable results are commissioning compliance issues and are to be documented by the Owner's Commissioning Agent on the Corrective Action Report (CAR) log.
2. Track and report commissioning compliance issues on the CAR log until resolution and retesting are successfully completed. The Construction Manager must sign off on each deficient item after they have verified with their subcontractor the deficiency has been successfully and finally resolved.
3. If a test demonstration fails, determine the cause of failure. Direct timely resolution of issue and repeat the testing demonstration. If a test demonstration must be repeated due to failure caused by Construction Manager work or materials, reimburse Owner for billed costs for the participation in the repeated demonstration.

4. Test Results: If a test demonstration fails to meet the acceptance criteria, perform the following:
  - a. Complete a commissioning compliance issue report form promptly on discovery of test results that do not comply with acceptance criteria.
  - b. Submit commissioning compliance issue report form within 24 hours of the test.
  - c. Determine the cause of the failure.
  - d. Establish responsibility for corrective action if the failure is due to conditions found to be Construction Manager's responsibility.
5. Commissioning Compliance Issue Report: Provide a commissioning compliance issue report for each issue. This form may be acquired from the Owner's Commissioning Agent. Do not report multiple issues on the same commissioning compliance issue report.
  - a. Exception: If an entire class of devices is determined to exhibit the identical issue, they may be reported on a single commissioning compliance issue report. (For example, if all return-air damper actuators that are specified to fail to the open position are found to fail to the closed position, they may be reported on a single commissioning issue report. If a single commissioning issue report is used for multiple commissioning compliance issues, each device shall be identified in the report, and the total number of devices at issue shall be identified.
  - b. Complete and submit initial commissioning compliance issue report immediately when the condition is observed.
  - c. Record the commissioning compliance issue report number and describe the deficient condition on the data form.
  - d. Resolve commissioning compliance issues promptly. Complete and submit the final commissioning compliance issue report when issues are resolved.
6. Diagnose and correct failed test demonstrations as follows:
  - a. Perform diagnostic tests and activities required to determine the fundamental cause of issues observed.
  - b. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
  - c. Record the results of each step of the diagnostic procedure.
  - d. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
  - e. Determine and record corrective action(s) required to resolve the issue(s).
  - f. Include diagnosis of fundamental cause of issues in commissioning compliance issue report.
7. Retest:
  - a. Schedule and repeat the complete test procedure for each test demonstration for which acceptable results are not achieved. Obtain signature of Owner's field construction observer on retest data forms. Repeat test demonstration until acceptable results are achieved. Except for issues that are determined to result from design errors or

omissions, or other conditions beyond Construction Manager's responsibility, compensate Owner for direct costs incurred as the result of repeated test demonstrations to achieve acceptable results.

- b. For each repeated test demonstration, submit a new test data form, marked "Retest."
- 8. Do not correct commissioning compliance issues during test demonstrations.
  - a. Exceptions will be allowed if the cause of the issue is obvious and resolution can be completed in less than ten (10) minutes. If corrections are made under this exception, the deficient conditions do not need to be documented.

### 3.6 COMMISSIONING MEETINGS

- A. The Owner's Commissioning Agent will schedule and conduct commissioning meetings. Comply with requirements in Section 01 31 00 "Project Management and Coordination."

### 3.7 SEQUENCING

- A. Sequencing of Commissioning Verification Activities: For a particular material, item of equipment, assembly, or system, perform the following in the order listed unless otherwise indicated:
  - 1. Construction Checklists:
    - a. Material checks.
    - b. Installation checks.
    - c. Startup, as appropriate. Some startups may depend on component performance. Such startups may follow component performance tests on which the startup depends.
    - d. Performance Tests:
      - i. Static tests, as appropriate.
      - ii. Component performance tests. Some component performance tests may depend on completion of startup. Such component performance tests may follow startup.
      - iii. Equipment and assembly performance tests.
      - iv. System performance tests.
      - v. Intersystem performance tests.
  - 2. Commissioning tests.
- B. Before performing commissioning tests, verify that materials, equipment, assemblies, and systems are delivered, installed, started, and adjusted to perform according to construction checklists.
- C. Verify system readiness of materials, equipment, assemblies by performing tests prior to performance testing demonstrations. Notify Design Professional via Request For Information (RFI) if acceptable results cannot be achieved due to design conditions beyond Construction Manager's control or responsibility.
- D. Commence tests as soon as installation checks for materials, equipment, assemblies, or systems are satisfactorily completed. Tests of a particular system may proceed prior to completion of other systems, provided the incomplete work does not interfere with successful execution of test.

### 3.8 SCHEDULING

- A. Commence commissioning process as early in the construction period as possible.
- B. Commissioning Schedule: Integrate commissioning activities into Construction Schedule. See Section 01 32 00 "Construction Progress Documentation."
  - 1. Include detailed commissioning activities in monthly updated Construction Schedule and six-week duration construction schedules.
  - 2. Schedule the start date and duration for the following commissioning activities:
    - a. Submittals.
    - b. Preliminary operation and maintenance manual submittals.
    - c. Installation checks.
    - d. Startup, where required.
    - e. Performance tests.
    - f. Performance test demonstrations.
    - g. Commissioning tests.
    - h. Commissioning test demonstrations.
  - 3. Schedule shall include a line item for each installation check, startup, and test activity specific to the equipment or systems involved.
  - 4. Determine milestones and prerequisites for commissioning process. Show commissioning milestones, prerequisites, and dependencies in monthly updated critical-path-method construction schedule and short-interval schedule submittals.
- C. Two-Week Look-Ahead Commissioning Schedule:
  - 1. Two weeks prior to the beginning of tests, submit a detailed two-week look-ahead schedule. Thereafter, submit updated two-week look-ahead schedules weekly for the duration of commissioning process.
  - 2. Two-week look-ahead schedules shall identify the date, time, beginning location, Construction Manager personnel required, and anticipated duration for each startup or test activity.
  - 3. Use two-week look-ahead schedules to notify and coordinate participation of Owner's witnesses.
- D. Owner's Construction Observer Coordination:
  - 1. Coordinate Owner's construction observation participation directly with the field assigned construction observer(s) and/or Construction Manager Agent.
  - 2. Notify Design Professional of commissioning schedule changes at least seven workdays in advance for activities requiring the participation of Owner's field construction observer(s) and/or Construction Manager Agent.

### 3.9 COMMISSIONING REPORTS

- A. Test Reports:
  - 1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:

- a. **Equipment Model Verification:** Compare contract requirements, approved submittals, and provided equipment. Note inconsistencies and document for project record submission.
  - b. **Preinstallation Physical Condition Checks:** Observe physical condition of equipment prior to installation. Note conditions including, but not limited to, physical damage, corrosion, water damage, or other contamination or dirt.
  - c. **Preinstallation Component Verification Checks:** Verify components supplied with the equipment, preinstalled or field installed, are correctly installed, wired correctly, and functional. Verify external components required for proper operation of equipment correctly installed and functional. Note missing, improperly configured, improperly installed, or nonfunctional components.
  - d. **Summary of Installation Compliance Issues and Corrective Actions:** Identify installation compliance issues and the corrective actions for each. Verify that issues noted have been corrected.
  - e. **Evaluation of System Readiness for Startup:** For each item of equipment for each system for which startup is anticipated, document in summary form acceptable to Owner and Owner's Commissioning Agent, completion of equipment model verification, preinstallation physical condition checks, preinstallation component verification checks, and completion of corrective actions for installation compliance issues.
2. Test data reports include the following:
    - a. "As-tested" system configuration. Complete record of conditions under which the test was performed, including, but not limited to, the status of equipment, systems, and assemblies; temporary adjustments and settings; and ambient conditions.
    - b. Data and observations, including, but not limited to, data trend logs, recorded during the tests.
    - c. Signatures of individuals performing and witnessing tests.
    - d. Data trend logs accumulated overnight from the previous day of testing.
  3. **Commissioning Compliance Issue Reports:** Report as commissioning compliance issues results of tests and test demonstrations that do not comply with acceptance criteria. Report only one issue per commissioning compliance issue report. Use sequentially numbered facsimiles of commissioning compliance issue report form included in this Section, or other form approved by Owner. Distribute commissioning compliance issue reports to parties responsible for taking corrective action. Identify the following:
    - a. Commissioning compliance issue report number. Assign unique, sequential numbers to individual commissioning compliance issue reports when they are created, to be used for tracking.
    - b. Action distribution list.
    - c. Report date.
    - d. Test number and description.
    - e. Equipment identification and location.
    - f. Briefly describe observations about the performance associated with failure to achieve

- acceptable results. Identify the cause of failure if apparent.
- g. Diagnostic procedure or plan to determine the cause (include in initial submittal)
  - h. Diagnosis of fundamental cause of issues as specified below (included in resubmittal).
  - i. Fundamental cause of unacceptable performance as determined by diagnostic tests and activities.
  - j. When issues have been resolved, update and resubmit the commissioning issue report forms by completing Part 2. Identify resolution taken and the dates and initials of the persons making the entries.
  - k. Schedule for retesting.
4. Weekly progress reports include information for tests conducted since the preceding report and the following:
- a. Completed data forms.
  - b. Equipment or system tested, including test number, system or equipment tag number and location, and notation about the apparent acceptability of results.
  - c. Activities scheduled but not conducted per schedule.
  - d. Commissioning compliance issue report log.
  - e. Schedule changes for remaining Commissioning-Process Work, if any.
5. Data trend logs shall be initiated and running prior to the time scheduled for the test demonstration.
- a. Trend log data format shall be multiple data series graphs. Where multiple data series are trend logged concurrently, present the data on a common horizontal time axis. Individual data series may be presented on a segmented vertical axis to avoid interference of one data series with another, and to accommodate different axis scale values. Graphs shall be sufficiently clear to interpret data within the accuracy required by the acceptance criteria.
  - b. Attach to the data form printed trend log data collected during the test or test demonstration.
  - c. Record, print out, and attach to the data form operator activity during the time the trend log is running. During the time the trend log is running, operator intervention not directed by the test procedure invalidates the test results.
6. System Alarm Logs: Record and print out a log of alarms that occurred since the last log was printed. Evaluate alarms to determine if the previous day's work resulted in any conditions that are not considered "normal operation."
- a. Conditions that are not considered "normal operation" shall be reported on a commissioning issue report attached to the alarm log. Resolve as necessary. The intent of this requirement is to discover control system points or sequences left in manual or disabled conditions, equipment left disconnected, set points left with abnormal values, or similar conditions that may have resulted from failure to fully restore systems to normal, automatic control after test completion.

### 3.10 CERTIFICATE OF CONSTRUCTION PHASE COMMISSIONING PROCESS COMPLETION

- A. When Construction Manager considers that construction phase commissioning process, or a portion thereof which Owner agrees to accept separately, is complete, Construction Manager shall prepare and submit to Owner and Owner's Commissioning Agent a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Construction Manager's responsibility to complete commissioning process.
- B. On receipt of Construction Manager's list, the Owner's Commissioning Agent will inspect to determine whether the construction phase commissioning process or designated portion thereof is complete. If the Owner's Commissioning Agent's inspection discloses items, whether included on Construction Manager's list, which are not sufficiently complete as defined in "Construction Phase Commissioning Process Completion" Paragraph in the "Definitions" Article, Construction Manager shall, before issuance of the Certificate of Construction Phase Commissioning Process Completion, complete or correct such items on notification by the Owner's Commissioning Agent. In such case, the Construction Manager shall then submit a request for another inspection by the Owner's Commissioning Agent to determine construction-phase commissioning process completion.
- C. Construction Manager shall promptly correct deficient conditions and issues discovered during commissioning process. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation for Design Professional and the Owner's Commissioning Agent services and expenses made necessary thereby, shall be at Construction Manager's expense.
- D. When construction phase commissioning process or designated portion is complete, the Owner's Commissioning Agent will prepare a Certificate of Construction Phase Commissioning Process Completion that shall establish the date of completion of construction phase commissioning process. Certificate of Construction Phase Commissioning Process Completion shall be submitted prior to requesting inspection for determining date of Substantial Completion.

END OF SECTION

SECTION OP - TEXAS TECH UNIVERSITY SYSTEM COMPONENT INSTITUTIONS  
OPERATING POLICIES AND PROCEDURES

**PART 1. INSTITUTIONAL OPERATING POLICIES**

1.1 TEXAS TECH UNIVERSITY

- A. <https://www.depts.ttu.edu/opmanual/>

1.2 TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER

- A. <https://www.ttuhsc.edu/administration/operating-policies/>

1.3 ANGELO STATE UNIVERSITY

- A. <https://www.angelo.edu/administrative-support/operating-policies-and-procedures/>

1.4 TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER – EL PASO

- A. <https://elpaso.ttuhsc.edu/opp/>

1.5 MIDWESTERN STATE UNIVERISTY

- A. <https://public.powerdms.com/MidwesternState/tree/>

END OF SECTION