tDIVISION 01 - GENERAL REQUIREMENTS

(Revised 4/2020)

The attached Division 01 section is a general guideline of UNI’s minimum requirements for a construction project. This section is intended to modify and expand on General Conditions, Institution Requirements, Project Requirements and the technical specifications. The following format coordinated with our General Conditions, Institution Requirements and Project Requirements must be used.

* This section cannot be used verbatim, it must be added to and edited to suit the project.
* Items noted with \* are optional and may be omitted if not required for the project.
* Instructions to spec editor are contained in ( ) and should be deleted during editing.
* When omitting optional sections, leave the numbering system in tact and insert “section not used” adjacent to that number. For new sections, use new numbers.
* Additional project specific items may be added as needed to fully describe the project conditions and existing items may be expanded on.
* The DESIGN PROFESSIONAL is required to meet with the UNI Design & Construction representative and the user of the space being modified or remodeled to establish conditions peculiar to this project and obtain a reasonable set of guidelines for use by the CONSTRUCTOR to coordinate the construction phase activities with minimal disruption to the occupants. These items are noted with \* \* and are further outlined on the attached checklist.
* All \* and \* \* shall be removed from final copy.

 01 10 00 - Summary

 01 20 00 - Price and Payment Procedures

 01 30 00 - Administrative Requirements

 01 33 00 - Submittal Procedures

 01 40 00 - Quality Requirements

 01 50 00 - Temporary Facilities and Controls

 01 60 00 - Product Requirements

 01 70 00 - Execution and Closeout Requirements

 01 74 19 - Construction Waste Management

 01 75 00 - Starting and Adjusting

 01 81 00 - General Commissioning Requirements

When LEED Certification is being sought add additional sections as required (credit summary, submittals forms, cost summary form, material content form, prohibited content, indoor air quality, VOC content restrictions and others as needed)

DIVISION 1 CHECKLIST – OWNER INPUT

##### Section 01 10 00 Summary

 Item 1.1 Contract Description

 Include a brief description of the work and the type of contract.

 Item 1.2 Work By Owner

List any other work by UNI, O&M or other CONSTRUCTOR, like carpet.

List other contract projects in the area that could affect the CONSTRUCTOR, either part of the project of separate nearby projects.

 Item 1.2 Salvage Items

Review with users and O&M for items to be salvaged and define the procedure to be followed for salvage. Who removes it, where is it delivered, etc.

 Item 1.3 Owner Supplied Products

Include items furnished by UNI to the CONSTRUCTOR for installation. Review with Design & Construction and users. Typically toilet paper dispensers, paper towel dispensers and soap dispensers are provided by UNI.

 Item 1.4 Use of Site

Define any restrictions on use, show construction limits and staging areas if any on drawings.

 List allowable utility outages and schedule major outages.

Identify any restrictions on work due to use of adjacent space; noise, odors, maintain exits etc. Indicate barriers on drawings. Identify modifications required to ductwork and systems.

 Item 1.6 Work Sequence

Define a sequencing plan where required. Prepare phasing drawings that isolate spaces and utilities as needed to keep occupied space separate from construction space. Show all barriers and utility modifications to separate the space.

 Item 1.7 Occupancy

Identify areas of the construction area or adjacent to the construction area that will be occupied during the project, define the extent of the occupancy.

 Item 1.9 Work Procedures

 Define work hours and any other conditions that restrict work.

###### Section 01 20 00 Price and Payment Procedures

 Item 1.1 Allowances – list

 Item 1.6 Unit Prices – leave or delete

 Item 1.7 Alternatives – list

###### Section 01 30 00 Administrative Requirements

Item 1.2 Project Management Computerized System shall be used for all projects.

 Item 1.3 List field engineering – surveying if needed.

 Item 1.7 List preinstallation meetings if desired.

###### Section 01 33 00 Submittal Procedures

 Item 1.1F List project specific milestones.

Item 1.2G Submittals List – DESIGN PROFESSIONAL to provide a detailed listing of all submittals required, not just a list of section numbers and titles but a detailed list. Similar to the one already started, the exact format may be modified to be compatible with DESIGN PROFESSIONALs format.

**Section 01 40 00 Quality Requirements**

Item 1.3D List testing required, edit existing list. Small projects use 1.3A. Large projects use 3.3

###### Section 01 50 00 Temporary Facilities and Controls

 Item 1.1D Storage Trailers

 UNI should verify if space is available.

 Item 1.3 to 1.11 Temporary Utilities

 Electricity, lighting, heating, ventilation, water, sanitary facilities –

 determine what will be provided in each category & who pays.

Phone/Fax/Internet – by CONSTRUCTOR, require internet for large project.

 Item 1.13 Fencing

Top rail is required. Areas with fabric should be noted on the plans, verify these locations with the CPM. Typically use 6’ high chain link for long term projects or where high traffic is expected.

Plastic safety fence may be used where allowed. Review need for wood top rail with CPM.

 Item 1.14 Construction Signage

Need to define on the drawings every place that a road, sidewalk or access point will be blocked and show a sign(s) as required to indicate the detour route. Wording of sign to be determined by CPM.

 Item 1.24 Access Roads/Site Traffic

This item reflects the cleanliness standard for Campus and preventing the spread of dirt from the construction site. Stone tire cleaners are required at each entrance (also see 1.30) and coordinate with NPDES.

 Item 1.25 Parking

~~CPM~~ DR (Design Representitive) to review project with UNI Police Department to determine where CONSTRUCTOR employees can park. Also review storage and staging areas. Note in plans/specs where the CONSTRUCTOR parking will be located.

 Item 1.27 Use of Elevator

Generally permitted if protected by the CONSTRUCTOR, review with CPM.

 Item 1.28 Field Offices

 Locate on drawing, avoid public highways.

 Item 1.30 Sediment and Erosion Control

NPDES regulations apply to all projects include this section and include the permit and narrative of the permit in the specification as an Appendix.

**Section 01 60 00 Product Requirements** – nothing

**Section 01 70 00 Execution and Closeout Requirements** – review and edit for job specific requirements.

###### Section 01 74 19 Construction Waste Management

 Add or delete Non-LEED or LEED requirements as needed.

###### Section 01 75 00 Starting and Adjusting

Item 1.2 Training required typically for all mechanical and some electrical items. UNI will provide a list to DESIGN PROFESSIONAL, check with ~~DC~~ DR and edit list in specifications.

Item 1.3 Testing and Balancing

Generally by UNI on large projects and part of the contract on small projects. (Review with Design Rep.~~& Construction~~).

**Section 01 81 00 Commissioning**

UNI will hire an independent commissioning agent or use in house forces to work with the DESIGN PROFESSIONAL and CONSTRUCTORs on major projects.

### 01 10 00 SUMMARY 01 10 00

PART 1 GENERAL

\* \* 1.1 CONTRACT DESCRIPTION

A. The Contract Documents are intended to identify one complete project. The divisions and sections of the specifications, identifications of any drawing or naming of any subcontractor is not intended to delineate work performed by any specific trade. The CONSTRUCTOR shall be responsible for assignment of work. The work is further defined as: (Insert a description of the work in outline format.)

B. Contract Type: (Insert type: stipulated sum, unit price, etc.).

C. (List DESIGN PROFESSIONAL and major subconsultants, company, address, phone, email, fax and contact person.)

\* \* 1.2 WORK BY OWNER

1. The OWNER [has awarded] [will award] contracts for supply and installation of [\_\_\_\_\_\_\_\_] which [commences] [will commence on] [\_\_\_\_\_\_\_\_].
2. Items noted NIC [Not in Contract] will be supplied and installed by OWNER [beginning] [before] [after] [\_\_\_\_\_\_\_\_].
3. OWNER will remove and retain possession of the following items before start of work:
4. [\_\_\_\_\_\_\_\_].
5. [\_\_\_\_\_\_\_\_].
6. CONSTRUCTOR will remove and OWNER will take possession of the following items prior to start of work; all items should be stored on site in locations as directed by the CPM.
7. [\_\_\_\_\_\_\_\_].
8. [\_\_\_\_\_\_\_\_].
9. All separate CONSTRUCTORS are responsible to work together and coordinate their efforts and use of the site. The prime CONSTRUCTOR will be responsible for coordinating efforts of all the CONSTRUCTORS.
10. The OWNER may hire other CONSTRUCTORS to perform various work items related to this project as needed. This CONSTRUCTOR shall coordinate and cooperate with any other CONSTRUCTOR.

\* \* 1.3 OWNER SUPPLIED PRODUCTS

1. OWNER’S Responsibilities
2. Arrange for and deliver OWNER reviewed Shop Drawings, Product Data, and Samples, to DESIGN PROFESSIONAL and CONSTRUCTOR.
3. Arrange and pay for Product delivery to site.

3. On delivery, inspect Products jointly with CONSTRUCTOR.

4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

5. Arrange for manufacturers’ warranties, inspections, and service.

1. CONSTRUCTOR’S Responsibilities:
2. Review approved OWNER supplied shop drawings, product data, and samples for conformance to the Contract Documents.
3. Receive and unload products at site; inspect for completeness or damage jointly with OWNER. (Coordinate with CPM)
4. Handle, store, install and finish products. (Coordinate with CPM)
5. Repair or replace items damaged after receipt.

C. DESIGN PROFESSIONAL’S Responsibility

1. Review shop drawings, product data and samples and incorporate Owner’s comments and suggestions.

 2. Coordinate requirements with other areas of the project.

D. Products supplied to site and installed by OWNER:

1. [\_\_\_\_\_\_\_\_].
2. [\_\_\_\_\_\_\_\_].

E. Items supplied by OWNER for installation by CONSTRUCTOR:

1. Toilet paper dispenser.
2. Paper towel dispenser.
3. Soap dispenser.

(Edit as required by Design & Construction)

\* \* 1.4 CONSTRUCTOR USE OF SITE AND PREMISES

1. Limit use of site and premises to allow:
2. OWNER occupancy.
3. Use of site and premises by [the public.] [\_\_\_\_\_\_\_\_.]

1. Access to Site: [Limited to [\_\_\_\_\_\_\_\_].]
2. Maintain use of all emergency building exits during construction for building occupants.
3. Time Restrictions for Performing [Interior] [Exterior] Work: [\_\_\_\_\_\_\_\_.]
4. The following major utility shutdowns have been identified and coordinated with affected parties on campus. These dates are firm and must be complied with or additional efforts will be required by the CONSTRUCTOR to prevent future loss of service (re. install additional valves, provide temporary generators, etc.). Work that will be performed by UNI has also been scheduled for proper coordination as noted below, these times are also fixed and cannot be changed.

(DESIGN PROFESSIONAL Review With Design & Construction and Insert List)

F. Minor utility outages (less than 4 hours) may be scheduled with the CPM. There is no guarantee that these shut downs can be done when requested, but some time will be found that is acceptable. Holiday, weekend or evening work may be required. This will require a minimum of two weeks notice, the exact length of time will vary depending on circumstances.

1. Existing facilities and site shall be maintained and protected by the CONSTRUCTOR as outlined in section 01 50 00 and the General Conditions.
2. The area allocated for construction including equipment and material storage shall be as shown on the drawings.
3. No signs of any type are permitted on the job site. Only project signs supplied by the OWNER or directional signs required by OWNER due to obstructions caused by construction.
4. The CONSTRUCTOR shall not ship materials to the OWNER’S central receiving facility or any other department. All shipments to the site must be sent to the project field office. The OWNER will reject all CONSTRUCTOR materials.

1.4.1 LIFE SAFETY

When construction will affect exits and access to existing buildings, the CONSTRUCTOR shall develop and submit an emergency fire and rescue plan for review by the OWNER and Cedar Falls emergency personnel. The plan shall be revised until acceptable by all parties. The accepted plan shall be maintained on site and by the CPM.

1.4.2 ELEVATOR USE

A. In a new building the CONSTRUCTOR may utilize the elevator at his risk. The warranty must be extended to cover construction and the normal warranty requested and it shall be turned over to the OWNER in a like new condition. An existing elevator may be used if agreed to by the owner. Contractor shall turn it back over to the owner in the same or better condition.

B. CONSTRUCTOR shall provide all required protective pads.

C. The CONSTRUCTOR shall not load the elevator beyond its rated capacity. Any damage shall be repaired at no cost to the OWNER.

D. Only elevators designated by the OWNER may be used during construction.

E. Elevators must be permitted and fully functional for use in delivery of furniture and personal items.

\* 1.5 FUTURE WORK

1. Project is designed for future [\_\_\_\_\_\_\_\_].
2. Provide [\_\_\_\_\_\_\_\_] for future installation of [\_\_\_\_\_\_\_\_].

\* \* 1.6 WORK SEQUENCE

1. Construct work in phases to accommodate OWNER’S occupancy requirements during the construction period, coordinate construction schedule and operations with OWNER:

(Insert a phasing/sequencing plan here, note all temporary utilities and other construction required to maintain occupancy and accommodate phasing as required. Also indicate all barriers; noise, dust, odor, etc.)

\* \* 1.7 OWNER OCCUPANCY

1. The OWNER will occupy the site/facility during [the entire period of construction]. [Phase] of construction]. [for the conduct of normal operations.] [for installation of [\_\_\_\_\_\_\_\_].]
2. Cooperate with OWNER to minimize conflict, and to facilitate OWNER’S operations. Develop alternative plans to coordinate occupancy and construction.
3. Schedule the Work to accommodate OWNER occupancy and use.

1.8 CONSTRUCTION KEYING AND ACCESS CARDS

1. At or before the preconstruction conference the OWNER and CONSTRUCTOR shall agree to a construction keying sequence. A minimum of 1 week notice is required to obtain construction keying. Access doors will be designated and construction cores installed. The CONSTRUCTOR will be required to sign for construction keys and pay $25 per key for any keys lost or unreturned by final acceptance. Final payment will not be made until all key issues are resolved.

If a key or card is lost and that requires rekeying of locks, the CONSTRUCTOR will be responsible for all rekeying charges. Once rekeying is started it will not be stopped.

\* \* 1.9 WORK PROCEDURES

A. Normal work hours at the job site are Monday thru Friday, excluding University

holidays, 7:00 AM to 5:00 PM except on residence projects or projects where noise will be heard in Residence Halls, 8:00 AM to 6:00 PM. Any exceptions must be approved by the OWNER.

1. No Smoking, tobacco, or e-cigarettes are permitted anywhere on campus. Persons caught smoking or using tobacco will be fined $50 per occurrence.

C. Radios and boom boxes are permitted on the construction site as long as the volume is controlled. If the OWNER receives any complaints, the radio or boom box must be removed from the site.

D. The CONSTRUCTOR is responsible for the conduct of all workers on the project. Workers exhibiting inappropriate conduct shall be removed from Campus.

E. For projects where the workers will be inside occupied dormitories, the CONSTRUCTOR shall supply colored shirts for all workers so they can be easily identified by residents. Workers without the proper colored shirt will not be allowed to work in the dormitory.

END OF SECTION

####  01 20 00 PRICE AND PAYMENT PROCEDURES 01 20 00

PART I GENERAL

\* 1.1 CASH ALLOWANCES

A. Cash Allowances shall be as defined in the General Conditions.

B. DESIGN PROFESSIONAL’S Responsibility:

1. Consult with CONSTRUCTOR and/or Owners Representative for consideration and selection of products, [suppliers,] [and] [installers].
2. Select products in consultation with OWNER and transmit decision to CONSTRUCTOR.

C. CONSTRUCTOR’S Responsibilities:

1. Assist DESIGN PROFESSIONAL and OWNER in selection of products, suppliers and installers.
2. Obtain proposals from suppliers and installers, check conformity to Contact Documents and offer recommendations.
3. On notification of selection by OWNER, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery and installation.
5. Promptly inspect Products upon delivery for completeness, damage, and defects. Verify completeness of order.
6. Unload, handle, store and protect items delivered to the site.

D. Differences in costs will be adjusted by Change Order prepared by the Construction Project Manager (CPM).

1. Allowances Schedule:

\* 1. (For project budgets over $100,000 include the following. Verify with

 UNI):

 Section 23 09 13 - Instrumentation and Control Devices for HVAC:

Include the stipulated sum of $[\_\_\_\_\_\_\_\_\_\_] for purchase and delivery of Siemens temperature control devices, programming, start-up, etc.

2. Section [\_\_\_\_\_-\_\_\_\_\_\_\_\_]: Include the stipulated sum of $[\_\_\_\_\_\_\_\_] for purchase and delivery of [\_\_\_\_\_\_\_\_].

1. Section [\_\_\_\_\_-\_\_\_\_\_\_\_\_]: Include the stipulated sum of $[\_\_\_\_\_\_\_\_] for installation of [\_\_\_\_\_\_\_\_].
2. Section [\_\_\_\_\_-\_\_\_\_\_\_\_\_]: Include the stipulated sum of $[\_\_\_\_\_\_\_\_] for purchase, delivery, and installation of [\_\_\_\_\_\_\_\_].
3. Section [\_\_\_\_\_-\_\_\_\_\_\_\_\_]: Include the unit price of $[\_\_\_\_\_\_\_\_] per [\_\_\_\_\_\_\_\_] for purchase, delivery, and installation of [\_\_\_\_\_\_].

F. Invoices must accompany applications for payment that includes allowance items.

1.2 SCHEDULE OF VALUES

1. Submit Schedule of Values in duplicate within ten (10) days after date of Notice of Award.
2. The Schedule of Values must include as a minimum labor and material dollar values for each of the following items:
* The Project Bond
* Project Startup and Mobilization
* Division 1 – General Requirements
* Project Closeout
* A line item for each applicable specification section. The schedule shall be further broken itemized by floors or areas as designated by the DESIGN PROFESSIONAL and OWNER. Identify each line item by specification number.
* Each allowance or unit price item included in the Contract.
1. Material values will include only anticipated bare costs of materials needed for the project and will not include any markup for overhead or profit.
2. Labor values for each line item will include all costs not considered to be material bare costs and will include the appropriate markup for overhead and profit.
3. Equipment, tools, engineering shop drawings and other items as necessary for clarity shall be itemized separately.
4. Include in each line item, the amount of Allowances specified in this section. For unit cost allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
5. Revise schedule to list approved Change Orders, with each Application for Payment.
	1. APPLICATIONS FOR PAYMENT

A. One week in advance of the meeting the CONSTRUCTOR shall publish the preliminary pay request on UNI’s Project Communication & Management System (Trimble Unity Construct) for review by the CPM and DESIGN PROFESSIONAL.

1. The DESIGN PROFESSIONAL, OWNER and CONSTRUCTOR will meet at the project site prior to the construction progress meeting for a pay request meeting. The meeting will be at the project site and all parties must be present. No requests for payment (telephone conversations, faxes, etc.) prior to this meeting will be acknowledged or accepted except stored materials. This will be the only time during the course of a month that the CONSTRUCTOR will have the opportunity to make a request for payment.
2. The DESIGN PROFESSIONAL, OWNER and CONSTRUCTOR will use the pay request meeting to agree on the appropriate percentage of completion for each line item listed in the Schedule of Values. The meeting will not conclude until all issues on items for payment have been resolved. One week in advance the CONSTRUCTOR shall submit photocopies of priced invoices for all material included in Stored Materials on the pay request. Invoices shall contain a reference to the project and a specific description of materials included. If invoices are not received and approved in advance, stored materials will be deleted from the application. No invoices will be accepted after the conclusion of that meeting until the next regularly scheduled pay request meeting. The CONSTRUCTOR is required to verify all quantities claimed on request.
3. No payment will be made for materials stored off site unless the storage facilities have been approved by the OWNER prior to the pay request meeting, and the CONSTRUCTOR has provided an insurance certificate listing UNI as loss payee and written statement giving UNI ownership without possession or control of the item(s). Off-site storage approval will not be granted during the course of a pay request meeting.
4. Submit each application to the DESIGN PROFESSIONAL in accordance with the General Conditions and the Institution Requirements on UNI’s Project Communication & Management System (Trimble Unity Construct).
5. Pay applications may be submitted monthly.
6. Include an updated construction progress schedule, in accordance with Section 01 30 00, an updated submittal schedule and all NPDES reports as required by Section 01 50 00 and all CONSTRUCTOR Daily Reports with every Application For Payment. Schedules and other additional data can be submitted electronically on UNI’s Project Communication & Management System (Trimble Unity Construct).

1.4 CHANGE PROCEDURES

A. Changes in the Work shall be processed according to General Conditions and as modified below.

1. The DESIGN PROFESSIONAL will advise of minor changes in the work not involving an adjustment to Contract Price or Contract Time by issuing supplemental instructions or responding to a RFI.

C. When approved by the OWNER, the DESIGN PROFESSIONAL or the CPM may issue a Proposal Request (PR) to the CONSTRUCTOR with a copy to the OWNER, which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications. CONSTRUCTOR will prepare and submit a price within fifteen (15) calendar days. Price shall include a detailed break down of costs including: labor, materials, equipment, tools, overhead and profit and quantity take offs of materials used for estimating. Labor costs shall be itemized. Once accepted, PR’s shall be included in a Change Order monthly.

1. The CONSTRUCTOR may propose changes by submitting a request for change to the DESIGN PROFESSIONAL with a copy to the OWNER, describing the proposed change and its full effect on the work. Include a statement describing the reason for the change and its full effect on the Contract Price and Contract Time with full documentation and a statement describing the effect on work by separate or other CONSTRUCTORS. Document any requested substitutions in accordance with Section 01 60 00.
2. Interim Directed Change (IDC): DESIGN PROFESSIONAL or OWNER may issue an IDC instructing the CONSTRUCTOR to proceed with a change in the work, for subsequent inclusion in a Change Order. Document will describe changes in the work, and designate method of determining any change in Contract Price or Contract Time. Promptly execute the change. The price for a IDC must be agreed to by all parties before it is included on a payment application. An IDC can only be added to an application for payment if the Change Order is delayed for an unreasonable amount of time and approval for inclusion in the application is granted by the Associate Director of Design & Construction. An IDC can be used to allow the work to proceed immediately or if no agreement can be reached on the price of a PR.
3. All cost proposals must be itemized to indicate unit price and unit quantity for materials; equipment; and man hours and hourly rate for labor. Credits and deducts applicable to each change should be separately identified. Taxes, insurance, overhead, and profit must be separately identified. Pricing which is not itemized will slow the approval process.

The pricing of changes in the work which result in an adjustment to the Contract Sum shall be limited to the direct expenses of the CONSTRUCTOR and subcontractors plus the applicable percentage of overhead and profit as described below:

* + 1. Net costs of labor, including social security, old age, and unemployment insurance, fringe benefits, and workmen’s compensation insurance. Labor cost shall be itemized to indicate trade, hourly rate, man hours, and total cost. Certified payroll sheets must be submitted on request.
		2. Net costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed. Material costs shall be itemized to include unit cost, quantity, and total cost for each item.
		3. Net rental costs of machinery and equipment, exclusive of hand tools, used solely for the Change Order work whether rented from the CONSTRUCTOR or others. Equipment costs shall be itemized to include equipment type, number of each, hourly rate, and total cost for each item.
		4. Costs of premiums for all bonds and insurance and permit fees related to the Work.
		5. Costs of supervision and field office personnel directly attributable to the change.
		6. Net costs of all work to be performed by the CONSTRUCTOR’S subcontractors. Subcontractor’s costs shall be appropriately itemized and the CONSTRUCTOR shall furnish copies of all subcontractors quotations and an itemization for all cost included. It is the responsibility of the General CONSTRUCTOR to review and approve all pricing of additional work required of its subcontractors and suppliers.
		7. A percentage mark-up for overhead and profit subject to the following limits:
			1. Fifteen (15) percent maximum for Work directly performed by employees of the CONSTRUCTOR, subcontractor, or sub-subcontractor.
			2. Five (5) percent maximum for Work performed or passed through by a subcontractor and passed through to the OWNER by the CONSTRUCTOR.
			3. Five (5) percent maximum subcontractor’s mark-up for Work performed by a sub-contractor and passed through to the OWNER by the subcontractor and CONSTRUCTOR.
1. The maximum allowable mark-up shall be twenty-five (25) percent passed through to the OWNER by the CONSTRUCTOR under any circumstances. Each percentage shall be applied to the base amount. Percentages shall not be taken on previously calculated percentages.
2. All completed IDC’s and approved PR’s will be included in Change Orders on a monthly basis.
3. Maintain detailed records of work done on time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the work.
4. Material invoices, time sheets and pay stubs may be required to verify costs.
5. To the fullest extent permitted by Iowa Code Chapter 554D, the parties agree that electronic records, signatures, systems, formats, transmissions and communications (collectively Electronic Transactions) may be utilized for this Project and all related documents, records, submissions, approvals, and communications. The parties agree that electronic signatures are the same as handwritten signatures for the purpose of validity, enforceability, and admissibility. The parties further agree that Electronic Transactions may be relied on for the purposes of binding information transfer for this Project. Unless otherwise agreed to in writing by the parties, the following shall be deemed an acceptable electronic signature for the purposes of this subsection: an electronic symbol or process attached to or logically associated with a record and executed or adopted by a person with the intent to sign the record.

In the event the laws, rules or regulations of a third party governmental agency or entity do not permit the use of Electronic Transactions or Electronic Signatures, then this section shall not apply but only to the extent necessary to comply with the laws, rules, or regulations of the third part governmental agency or entity.

1.5 CHANGE IN TIME

A. Any request for a change in time must be accompanied by a justification for the change and a description of the impact on the critical path for the project as a minimum. Additional information may be requested by the OWNER.

B. A revised schedule showing the effect of the change compared to the original schedule shall be submitted with the request for additional time. No time extensions will be granted without detailed documentation.

\* 1.6 MEASUREMENT AND PAYMENT – UNIT PRICES

1. Measurement methods are delineated in the individual specification sections.
2. The DESIGN PROFESSIONAL or the CPM will take measurements and compute quantities accordingly. The CONSTRUCTOR shall assist in the taking of measurements.
3. Unit Quantities: Quantities and measurements indicated in the Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the work shall determine payment.
4. Payment includes: Full compensation for required labor, Products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the work; overhead and profit.
5. The unit price for work may be reevaluated if the quantity for that item varies by more than 20% from the estimated quantity.

F. Measurements of Quantities:

1. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel, or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
2. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
3. Measurement by Area: Measured by square dimension using mean length and width or radius.
4. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

\* 1.7 ALTERNATIVES

1. Accepted alternatives will be identified in Agreement.
2. Coordinate related work and modify surrounding work as required.
3. Schedule of Alternatives: (include alternates as required.)
4. Alternative No. 1:

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

 Not Used.

END OF SECTION

### 01 30 00 ADMINISTRATIVE REQUIREMENTS 01 30 00

PART 1 GENERAL

1.1 COORDINATION

1. Coordinate, scheduling, submittals, and work of the various sections of the specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
2. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
3. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs. In congested areas the CONSTRUCTOR shall prepare coordination drawings to insure proper fit and clearance for all items. Coordination drawings must be approved by the DESIGN PROFESSIONAL before the work begins.
4. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
5. Coordinate completion and clean-up of work of separate sections in preparation for Substantial Completion and for portions of work designated for OWNER’S partial occupancy.
6. After OWNER occupancy of premises, coordinate access to site with CPM for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of OWNER’S activities.

G. If a regulatory agency (OSHA or others) is inspecting the job site both the Associate Director of Design & Construction and the University Safety Officer must be notified and will attend the inspection.

1.2 INTERNET BASED PROJECT COMMUNICATIONS

1. An internet based project communication & management system (Trimble Unity Construct) will be utilized on this project to share information among team members and conduct and track project communications. The CONSTRUCTOR is required to participate with the project team and use the system for viewing correspondence and information posted by other project team members and logging and/or responding to such as RFI’s and Shop Drawings. There are no fees required for access to the system. University of Northern Iowa will provide team members with password protected access privileges to the project web site.

Minimum System and Software Requirements:

* Operating Systems: Microsoft Windows
* Internet connection (high speed connection recommended)
* Internet Explorer latest edition
* Software to create and read Adobe Acrobat files
* Scanner

All submittals, RFIs, ASIs, PRs, IDCs, COs, Application for Payment and other project related correspondence and documentation shall be conducted in the Project Communication & Management System.

The electronic file should contain all relevant project information.

Training is available from Trimble Unity Construct.

* 1. FIELD ENGINEEERING

\* A. Employ a Land Surveyor registered in the State of Iowa, to locate control points and datum as shown on the drawings.

B. CONSTRUCTOR shall locate and protect survey control and reference points.

C. Verify setbacks and easements; confirm drawing dimensions and elevations.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

* 1. PRECONSTRUCTION CONFERENCE
1. The CPM will schedule a meeting after Notice of Award.
2. Attendance Required: OWNER, DESIGN PROFESSIONAL, CONSTRUCTOR, and major subcontractors.

C. A list of key personnel and the initial construction progress schedule shall be submitted seven (7) calendar days prior to the preconstruction meeting.

D. During the pre-construction conference or before starting the work, the CONSTRUCTOR shall conduct a survey of the proposed construction area to locate and document existing damage on video or photographs and provide a copy of the documentation to the CPM. On completion of the project any damage found that was not documented prior to the start of construction shall be repaired by the CONSTRUCTOR at no cost to the OWNER.

E. Agenda:

 1. Introductions: CONSTRUCTOR, Subcontractors, DESIGN PROFESSIONAL, OWNER, Others. This includes designation of responsible personnel throughout the duration of the contract.

 2. Status of Contract Documents

 a. Notice of Award

 b. Form of Agreement

 c. Insurance Certificates

1. Construction Set Documents

 3. Subcontractors

1. Review Subcontractor List (Submittal required within 48

 hours of the receipt of the Notice of Award). UNI will post on Trimble Unity Construct site.

 4. List of Key Personnel

 a. Project Superintendent

 b. Project Manager

 c. Other Key Personnel

 d. Documentation for all workers having OSHA 10 hour

 training.

 e. Telephone Numbers; On-site, Office, Emergency/After

 Hours.

 f. Communication

 5. Construction Schedule

 a. Start/Commence Date

 b. Discussion of Schedule

 c. Contract Time – completion

 d. The UNI Hazardous Material Plan is available in the Safety

 Office. Hazardous materials in the building are available in

 the building office.

 e. Liquidated Damages, if appropriate as noted in the Project

 Requirements.

 6. Construction Progress Meetings

1. Meetings shall be minimum of once every two weeks.

Once a week if schedule/circumstances deem necessary.

 b. Set day of week, time, location and frequency.

 c. Meetings shall be run by CONSTRUCTOR.

 d. Minutes/Distribution by DESIGN PROFESSIONAL on

 Trimble Unity Construct.

 e. Other meetings.

 7. Application for Payment

1. Schedule of Values (shall be submitted to OWNER within 21 days and approved by OWNER prior to initial pay application.)

 b. Stored Materials, On/Off Site (Bill of Sale/Insurance)

 c. Post preliminary copy of Application for Payment on

Trimble Unity Construct to allow OWNER and DESIGN PROFESSIONAL to review prior to Pay Request meeting.

 d. Form Provided by OWNER.

 e. Provide updated submittal schedule and progress schedule with Application for Payment.

 f. NPDES documentation when required.

 g. Updated schedule and other information as required.

 8. Shop Drawings

1. CONSTRUCTOR to provide a submittal schedule outlining all required submittals and anticipated time frame prior to first Application for Payment. All SDS shall be provided and maintained on site.
2. All submittals shall be numbered both sequentially and according to specification section with sub numbers for each submittal. Ex. 042000-1. If additional submittals are needed in the same section, number sequentially. Ex. 042000-2.
3. Submittals shall be submitted electronically via Trimble Unity Construct. Reviewed and commented on and reposted or adjusted as required.

d. Re-submittals shall maintain the same section number but a revised “R” submittal number. Ex. 042000-1R1. If resubmitted a second time, 042000-1R2.

e. No substitutions will be permitted unless prequalified and presented in accordance with Section 01 60 00 of the specifications.

 9. Changes to Contract Amount

1. Interim Directed Change

 b. Proposal Request

 c. Change Orders

 d. Change in time – must be fully justified (see specifications)

 10. Clarifications of Documents

1. Supplemental Instructions
2. Request for Information

 11. Utilities

 a. Locations, Responsibility

 b. Temporary

 c. Usage of University Utilities by CONSTRUCTOR

 d. Telephone

e. Toilet Facilities

 12. Testing and Scheduling Owner’s Testing Agency

 a. All testing required by the technical specifications shall be

 scheduled by the CONSTRUCTOR with the OWNER’S

 testing agency.

 b. All testing performed by CONSTRUCTOR shall be witnessed by the CPM.

 13. Security

 a. Job Site Security

 b. Temporary Lighting

 c. Fencing/Barricades

1. Keys

 e. Maintenance and Housekeeping Procedures

 f. UNI Alert System

 14. Use of Site

 a. CONSTRUCTOR Parking

 b. Construction Parking Permits

 c. Construction Limits

 d. OWNER approval of fence and gate location

 e. CONSTRUCTOR shall reuse and recycle as specified.

 15. Other Issues Related to Project (Examples below. Shall be

 customized as needed.)

 a. Asbestos Abatement

 b. Materials Testing

 c. Material Deliveries

 d. Construction Staking

 e. Working Hours

 f. Excess Dirt Removal/Disposal

 g. Salvage Items

 h. OWNER Furnished Materials

 i. Concrete Truck Wash-Out

 j. Hydrant Meter/Water Keys

 k. Hot Work Permits

 l. NPDES

 m. OWNER Occupancy

 n. No smoking, tobacco, or e-cigarettes used anywhere on campus

 16. Substantial Completion

 a. Punch List Inspection

 b. OWNER Occupancy

 c. Equipment Training/Demonstration

 d. Substantial Completion Certificate

 e. As-Built Drawings/Documents

 f. Operation and Maintenance Manuals

 17. Project Acceptance

 a. Punch List Completion

 b. Final Inspection

 c. Final Application for Payment/Retainage

 d. TSB Reporting Form

1.5 PROGRESS MEETINGS

1. The CONSTRUCTOR shall schedule and administer meetings throughout progress of the work at minimum of every two weeks. More frequently if deemed necessary by the CPM.
2. Attendance Required: Job superintendent, major Subcontractors and suppliers, OWNER, DESIGN PROFESSIONAL, as appropriate to agenda topics for each meeting.
3. The CONSTRUCTOR shall prepare and distribute copies of logs for: Submittals, RFI’s, SI’s, PR’s/IDC’s and Change Orders to the DESIGN PROFESSIONAL and CPM. The CONSTRUCTOR shall also provide a short term schedule with 4 week duration of anticipated progress.
4. Agenda:
5. Review minutes of previous meetings.
6. Review of work progress.
7. Field observations, problems, and decisions.

Identification of problems which impede planned progress.

1. Planned progress during succeeding work period and coordination of projected progress – utility shutdowns, road closings, etc. required during the next work period.
2. Review of submittals schedule and status of submittals.
3. Review of schedule status and corrective measures to regain projected schedules if needed.

7. Status of PR’s, IDC’s., CO’s and RFI’s.

8. Safety and security.

 9. Outstanding issues to be resolved.

1. DESIGN PROFESSIONAL to record minutes and post on Trimble Unity Construct within seven (7) days after meeting to participants, OWNER, and those affected by decisions made.

1.6 SUBCONTRACTORS MEETING

A. The CONSTRUCTOR shall inform the CPM of the times of all subcontractor and coordination meetings and other meetings related to progress or schedule of the project.

\* 1.7 PREINSTALLATION MEETING

1. When required in individual specification sections, the CONSTRUCTOR shall convene a preinstallation meeting at the site prior to commencing work of the section.
2. Require attendance of parties directly affecting, or affected by, work of the specific section.
3. Notify DESIGN PROFESSIONAL and CPM a minimum of one week in advance of meeting date. Coordinate with regularly scheduled progress meetings.
4. CONSTRUCTOR shall prepare agenda and preside at meeting.

E. Review conditions of installation, preparation and installation procedures.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

3.1 COORDINATION DRAWINGS

A. The CONSTRUCTOR shall be responsible for the preparation, submittal and coordination of Coordination Drawings to determine and coordinate adequate clearances and space requirements for structure and all above ceiling electrical, mechanical, plumbing and similar utilities and construction.

1. The CONSTRUCTOR shall require all subcontractors to provide information for the coordination drawings and to participate in the coordination process.

2. The CONSTRUCTOR will not be allowed any time extensions or any extra payment for participation in the coordination drawing process. All coordination drawings must be submitted for review prior to the start of any work.

B. Access panels shall occur only in gypsum wallboard or plaster ceilings where indicated on the drawings. Access to mechanical and electrical items shall be through accessible acoustical ceiling areas. Additional access panels will not be allowed without written approval from the DESIGN PROFESSIONAL and OWNER at the coordination drawing stage and only after alternatives are reviewed. Layout changes shall be made to avoid additional access panels. If additional access panels are required, they shall be provided at no additional cost to the OWNER.

 C. Drawing Requirements:

1. Coordination drawings shall indicate structural components, reflected ceiling layout and all above ceiling equipment, utilities and other objects. Indicate on the coordination drawings where components will be installed and how the service access area to such items shall be maintained. Illustrate items requiring access for maintenance or adjustment.

2. Coordination drawings shall indicate the following major system components (including insulation, hub or connection widths with verification of turning radius):

 a. Roof drain leaders

 b. Large waste piping

 c. Sprinkler mains

 d. Pneumatic tube system layout

 e. Equipment located above the ceiling

 f. Heating hot water piping

 g. Chilled water piping

 h. Conduit runs 2” and larger

 i. Cable tray

 j. Bus duct

 k. Recessed light fixtures

 l. Building wiring or cable trays

m. Ceiling heights as shown in contract documents and thickness of system

 n. Soffits (including framing of supports)

 o. Access points and clearances required

 p. Access panels

 q. Valves

 r. Dampers

 s. Coils

 t. Ductwork

 u. Fire rated wall, partition, and floor penetrations

 v. Steam and condensate piping

 w. Space allotted for future utilities

 x. Equipment in mechanical and electrical spaces

y. Other systems or construction as necessary to fully coordinate all above ceiling construction

3. Each pipe, duct, conduit or other object shown shall be labeled to indicate distance from the nearest parallel column line, the nature of the object (“5 inch gas pipe”, etc.) and the height above the finished floor.

 4. Indicate clearance requirements to all equipment.

 5. Indicate all required access points.

6. Indicate deviations from the contract documents that are necessary for overall system installation and coordination. Bubble or in some way highlight such deviations and call them out with a note explaining the reason for the required deviation.

7. The CONSTRUCTOR shall work with the subcontractors to resolve all conflicts before drawings are submitted and where conflicts appear to occur even after the priority ranking of utility routing has been utilized, clearly indicate these conflicts for review by the DESIGN PROFESSIONAL. Where possible, provide recommended solutions with the coordination drawings.

8. Drawing shall be submitted at a scale of ¼ inch equals 1 foot – 0 inches.

9. The submitted coordination drawings shall indicate which subcontractors participated in the process.

 D. Submittal and Review Process

1. The CONSTRUCTOR shall submit completed coordination drawings to the DESIGN PROFESSIONAL for review. Drawing shall be submitted following the requirements for all submittals.

2. The DESIGN PROFESSIONAL will only review conflicts and give an opinion but will not act as a coordinator.

3. Where conflicts do exist, the DESIGN PROFESSIONAL reserves the right to establish the priority of one piece of equipment or system over another.

4. The DESIGN PROFESSIONAL will review and return an opinion to the CONSTRUCTORS for implementation.

 E. Changes Resulting from Coordination

1. No contract cost extra shall be allowed for changes required to an individual CONSTRUCTOR or subcontractors routing or placement which is determined to be necessary as result of the coordination process.

 F. Approval and Handling of Drawings

1. All CONSTRUCTORS shall agree to the final coordinated layout by signing off on the coordination drawings before any construction can begin.

2. Maintain an updated set of coordination drawings at the job site reflecting changes, modifications and adjustments.

 G. Failure to Participate

1. The CONSTRUCTOR and subcontractors responsible for items or work located in or above ceilings shall participate in the coordination drawing process. Participation is mandatory. If the CONSTRUCTOR or subcontractor fails to participate in the coordination drawing process they will be responsible for any additional costs required to resolve conflicts.

3.2 CUTTING AND PATCHING

A. The CONSTRUCTOR shall be responsible for cutting and patching surfaces to make the work fit in accordance with General Conditions.

B. Employ skilled and experienced installer to perform cutting and patching.

C. Submit written request in advance of cutting or altering elements which affect:

1. Structural integrity of element. All beams, columns or other structural elements must be reviewed by the DESIGN PROFESSIONAL prior to cutting.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight exposed elements.
5. Work of OWNER or separate CONSTRUCTOR.

D. Execute cutting, fitting, and patching including excavation and fill, to complete work, and to:

1. Fit the several parts together, to integrate with other work.
2. Uncover Work to install or correct ill-timed work.
3. Remove and replace defective and nonconforming work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of work for penetrations of mechanical and electrical work.

E. Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

F. Cut masonry and concrete materials using masonry saw or core drill.

G. Restore Work with new products in accordance with requirements of Contract Documents.

H. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Provide fire rated or sound rated seals where required.

I. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to the DESIGN PROFESSIONAL and CPM for decision or remedy.

3.3 ALTERATION PROJECT PROCEDURES

1. Materials: As specified in Product sections; match existing Products and Work for patching and extending work.
2. Employ skilled and experienced installer to perform alteration Work.
3. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.
4. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original condition.
5. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition of each material, with a neat transition to adjacent finishes.
6. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent work in texture and appearance.
7. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural

line of division and submit recommendation to DESIGN PROFESSIONAL for review.

1. Where a change of plane of ¼ -inch (6 mm) or more occurs, submit recommendation for providing a smooth transition; to DESIGN PROFESSIONAL for review.
2. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
3. Finish surfaces as specified in individual Product sections.
4. CONSTRUCTOR shall x-ray to locate all existing reinforcing steel prior to cutting or drilling. If any reinforcing is cut the CONSTRUCTOR must hire a structural engineer to evaluate the damage and design remedial measures to restore the members to original condition. The CONSTRUCTOR shall provide copies of sketches and calculations prepared by the Engineer to the CPM.

END OF SECTION

# 01 33 00 SUBMITTAL PROCEDURES 01 33 00

PART 1 GENERAL

* 1. CONSTRUCTION PROGRESS SCHEDULES in accordance with General Conditions, Institution Requirements and the following:

A. The initial construction progress schedule shall be submitted with, or prior to, the first application for payment is preferred in Microsoft Project format. The schedule must be approved before an application for payment will be processed. When accepted by the OWNER, the schedule will become an official contract document to be modified only by Change Order.

B. The estimated start date, duration time, and finish date and the actual start date, duration time, and finish date shall be indicated for each item defined in the schedule of values. Interdependent activities shall be suitably linked to indicate proper sequencing and the critical path shall be clearly defined.

C. The Construction Schedule shall include the following at a minimum:

1. Notice of Award Date. 2. 2. Substantial Completion Date and Final Completion Date for all

 phases of the project and all other milestone dates specified herein.

3. Product submittals start and completion date.

4. Date that construction will begin on site.

5. Proposed start date, duration, and finish date of each item

 defined in the schedule of values.

 6. Required decision dates.

 7. Preinstallation meetings as specified.

 8. Required delivery dates for OWNER Furnished Equipment.

 9. Programming of control systems, point to point check out.

 10. Time for testing and balancing of all systems.

 11. Equipment start up and commissioning for each system.

 12. OWNER training for each system.

 13. Time restraints imposed by the OWNER that affect progress.

 14. Acceptance testing, required inspections and punch list dates.

 15. Move in of furniture and equipment.

 16. Building signage.

 17. Building flush out.

 18. Substantial Completion.

19. Time for completion of punch list.

20. OWNERS move in and occupancy.

21. Final Acceptance.

D. Any and all tie-ins, outages, or interruptions to the OWNER’S operations must be noted in the construction schedule as stated in the General Conditions and Section 01 10 00 must be approved by the OWNER prior to inclusion in the construction schedule. All such tie-ins, outages, or interruptions to the OWNER’S operations must be designated by the CONSTRUCTOR or design engineer and approved by the CPM and the affected occupants.

E. The schedule shall be marked up each month to reflect actual progress relative to original projection. Each line shall indicate approximate percentage complete. A marked up schedule shall be submitted with each application for payment or more frequently if deemed necessary by the OWNER.

F. The schedule shall be a cooperative effort of all CONSTRUCTORS and subcontractors and shall indicate all significant milestones including (Insert list here. Consult with Design & Construction, see 1.1C)

G. In addition to the monthly overall schedule, the CONSTRUCTOR shall provide short term schedules at each progress meeting as noted in Section 01 30 00 1.4C.

H. For each area where work is behind schedule, a detailed plan must be prepared to accelerate the work efforts to get back on schedule, at no additional cost to the OWNER. If work falls behind schedule an updated schedule shall be presented at every progress meeting along with an assessment of how the acceleration plan is working. If plans to accelerate the work to get back on schedule do not succeed in one month the CONSTRUCTOR must provide a detailed written manpower analysis for each task that is behind schedule. The analysis should indicate the total man hours required for the task and the proposed staffing.

1.2 COMPLETION SCHEDULE

A. As the project nears completion (around 70%) or within four months of the substantial completion date, the CONSTRUCTOR shall prepare a completion schedule. This schedule shall maintain the same milestones and critical path as the original schedule, but shall include more detail to be able to track the project on a more detailed basis.

B. This schedule on acceptance will also be considered a contract document and shall be updated and submitted in the same manner as the original schedule.

1.3 SUBMITTAL PROCEDURES

1. Submittals shall be processed in accordance with the General Conditions.
2. The CONSTRUCTOR shall publish shop drawings and product data on UNI’s Trimble Unity Construct. All submittals shall be numbered according to specification section with sub numbers for each submittal. Ex. 042000-1. If additional submittals are needed in the same section, number sequentially. Ex. 042000-2. Re-submittals shall maintain the same section number but a revised “R” submittal number. Ex. 042000-1R1. If resubmitted a second time, 042000-1R2.
3. Submittals shall be submitted electronically via Trimble Unity Construct. Reviewed and commented on and reposted or adjusted as required.
4. Submit color and material samples in duplicate, 1 to OWNER and 1 to DESIGN PROFESSIONAL. Samples for the OWNER shall be maintained at the CONSTRUCTOR’S trailer or site office until completion of the project.
5. The OWNER and the DESIGN PROFESSIONAL shall review submittals. The OWNER will issue any comments to the DESIGN PROFESSIONAL and the DESIGN PROFESSIONAL shall respond as follows:
6. Approved – No Exceptions Taken
7. Approved As Noted
8. Revise and Re-Submit
9. Rejected
10. No Action Required
11. The DESIGN PROFESSIONAL shall post reviewed shop drawing on UNI’s Trimble Unity Construct.
12. Submittals are required for the following items and additional items as required to describe the work:

MR – Mfg. Report SD – Shop Drawings R – For Review

MI – Mfg. Info PD – Product Data I – Information Only

DD – Design Data S – Sample C – Certification

 T – Test Report E – Erection Drawing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   Spec Section  |  Description |  Submittal SD,PD,S,MR,MD,MI C,T,E,DD | Action R I | Remarks |
| IR 2.1 | OSHA Certification |  |  |  |
| IR 2.5.4 | Fire Watch Procedure Plan |  |  | Before work starts |
| IR 2.6.2 | Hazardous Communication Form |  |  | Before work starts |
| IR 2.11 | Hot Work Permit |  |  | Before work starts |
| IR 3.2 | Site Staging |  |  | Before work starts |
| IR 3.3 | Site Conditions |  |  | Before work starts |
| IR 7.2 | Hazardous Material Certification |  |  | Before work starts |
| IR 7.4 | Preliminary O & M |  |  | 60 Days before Substantial Completion |
| 01 10 00 | Emergency Plan |  |  R | Before preconstruction |
| 01 20 00 | Schedule of Values |  |  R | In 10 Days |
| 01 30 00 | Coordination Drawings |  | E, I, R | Before work starts |
| 01 30 00 | List of Key Personnel |  |  I | 7 days before preconstruction |
| 01 30 00 | Product List |  |  R |  |
| 01 30 00 | Subcontractor List |  |  R | Within 48 hours of award |
| 01 30 00 | Cutting and Patching |  |  R |  |
| 01 30 00 | Damage Survey Documentation |  |  I | Before work starts |
| 01 33 00 | Construction Progress Schedule |  |  R | Before Preconstruction Meeting |
| 01 33 00 | Closeout Schedule |  | @ 70% |  |
| 01 33 00 | Product List |  | R I | Within 25 Days of Award |
| 01 33 00 | Submittal Schedule |  |  R, I | Before Preconstruction Meeting |
| 01 70 00 | Certification that work is complete |  |  R |  |
| 01 70 00 | Record Documents |  |  R |  |
| 01 70 00 | O & M Manuals |  |  R | Before Substantial Completion |
| 01 70 00 | Construction Keys |  |  - |  |
| 01 70 00 | TSB Reports |  |  - |  |
| 01 74 19 | Construction Waste Management Plan |  |  R |  |
| 01 75 00 | Report of Equipment Installation |  |  R |  |

H. The CONSTRUCTOR shall prepare and maintain a submittal schedule.

I. Submittal Schedule to be submitted with or prior to the first Application For Payment. The DESIGN PROFESSIONAL will review and approve the submittal schedule to serve as the basis for submittal reviews. An updated submittal schedule shall be included with each Application For Payment.

J. Shop Drawings, Product Data and samples shall be submitted in accordance with General Conditions 3.14. Shop Drawings will be reviewed by OWNER and the DESIGN PROFESSIONAL within fourteen (14) calendar days of receipt or in accordance with the approved submittal schedule.

1.3 PRODUCT DATA

1. Product Data For Review:
2. Submitted to DESIGN PROFESSIONAL and OWNER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
3. Product Data For Information:
4. Submitted for knowledge of the DESIGN PROFESSIONAL and the OWNER
5. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers’ standard data to provide information specific to this Project.
6. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. Submit Safety Data Sheets with each product to be used. Sheets to be kept on file with CONSTRUCTOR and OWNER.

F. If any products contain one of the following chemicals, the product and amount of chemical shall be reported to the CPM; ammonium nitrate, nitric acid, nitric oxide, potassium nitrate, potassium permanganate or sodium nitrate. The amounts of these specific chemicals must be recorded and reported to the CPM.

1.4 SHOP DRAWINGS (Reference General Conditions)

1. Shop Drawings For Review:
2. Submitted to DESIGN PROFESSIONAL and OWNER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
3. Shop Drawings For Information:
4. Submitted for knowledge of DESIGN PROFESSIONAL and the OWNER.
5. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional

equipment and appliances.

1.5 SAMPLES

1. Samples For Review:
2. Submitted to DESIGN PROFESSIONAL and OWNER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Samples for OWNER review shall be maintained at the CONSTRUCTOR’S job site trailer/office until completion of the project.
3. Samples For Information:
4. Submitted for knowledge of DESIGN PROFESSIONAL and the OWNER.
5. Samples For Selection:
6. Submitted to DESIGN PROFESSIONAL and OWNER for aesthetic, color, or finish selection.
7. Submit samples of finishes from the full range of manufacturers’ standard colors, textures, and patterns for OWNER selection.
8. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work. Electronic color charts are not accepted.
9. Include identification on each sample, with full Project information.
10. Submit the number of samples specified in individual specification sections; one (1) of which will be retained by DESIGN PROFESSIONAL and one (1) by CONSTRUCTOR, on site, for the OWNER.
11. Reviewed samples which may be used in the Work are indicated in individual specification sections.
12. Samples will not be used for testing purpose unless specifically stated in the specification section.

1.6 DESIGN DATA

1. Submit for the OWNER’S information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.7 TEST REPORTS

1. Submit for the OWNER’S information as contract administrator.
2. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.8 CERTIFICATES

1. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the CONSTRUCTOR to DESIGN PROFESSIONAL, in quantities specified for Product Data.
2. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
3. Certificates may be recent or previous test results on material or Product, but must be acceptable to DESIGN PROFESSIONAL and OWNER.

1.9 MANUFACTURER’S INSTRUCTIONS

1. When Specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to DESIGN PROFESSIONAL for delivery to OWNER in quantities specified for Product Data.
2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
3. Refer to Section 01 40 00 – Quality Control, Manufacturers’ Field Services article.

1.10 MANUFACTURER’S FIELD REPORTS

1. Submit reports for information to the DESIGN PROFESSIONAL and the OWNER.
2. Submit report in duplicate within thirty (30) days of observation to DESIGN PROFESSIONAL and OWNER for information.
3. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.11 ERECTION DRAWINGS

1. Submit drawings for the knowledge of the DESIGN PROFESSIONAL and the OWNER.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.
3. Data indicating inappropriate or unacceptable work may be subject to action by the DESIGN PROFESSIONAL or OWNER.

1.12 DAILY LOGS

A. CONSTRUCTOR shall publish copies of his daily logs that indicate number of workers on site for each trade, weather and other specific job conditions to the CPM on UNI’s Trimble Unity Construct in the Project Observations & Photos category.

B. Copies to be posted weekly. Failure to post will delay payment.

1.13 GROUPING OF SUBMITTALS

A. Submittals for items that are connected or interrelated should be made at the same time to expedite review. CONSTRUCTOR and DESIGN PROFESSIONAL to coordinate timing when preparing the submittal schedule.

 B. Partial or incomplete submittals may be rejected without review.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

 Not Used.

END OF SECTION

# 01 40 00 QUALITY REQUIREMENTS 01 40 00

PART 1 GENERAL

1.1 QUALITY ASSURANCE – CONTROL OF INSTALLATION

1. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
2. Comply with manufacturers’ instructions, including each step in sequence.
3. Should manufacturers’ instructions conflict with Contract Documents, request clarification from DESIGN PROFESSIONAL before proceeding.
4. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
5. Perform Work by persons qualified to produce required and specified quality.
6. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
7. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.2 TOLERANCES

1. Monitor fabrication and installation tolerance control of Products to produce acceptable work. Do not permit tolerances to accumulate.
2. Comply with manufacturers’ tolerances. Should manufacturers’ tolerances conflict with Contract Documents, request clarification from DESIGN PROFESSIONAL before proceeding.

1.3 INSPECTION AND TESTING LABORATORY SERVICES

A. The OWNER reserves the right to engage an independent testing agency for testing as outlined in General Conditions unless noted otherwise in the individual technical specifications.

B. The CONSTRUCTOR shall notify both the CPM and the OWNER’S testing agency of all tests to be conducted a minimum of 24 hours in advance so arrangements can be made to perform tests or observe the procedure as required.

1. Written reports shall be prepared for all testing performed by the CONSTRUCTOR. Reports to include name of person performing test, type of test, date of test, results of test, specification section requiring the test and OWNER’S Representative that witnessed the test. Report shall be posted to Trimble Unity Construct. All tests shall be observed by the all parties.

Cover up inspections – the DESIGN PROFESSIONAL shall review all MEP items that will be concealed in the construction prior to be covered.

D. OWNER reserves the right to obtain the services of a testing firm for all testing by OWNER as listed in the individual technical specifications and special inspections section. Failure to perform these tests does not relieve the CONSTRUCTOR from his responsibility to construct the project in accordance with the contract documents.

E. If the CONSTRUCTOR fails to notify the OWNER or the OWNER’S testing agency of the need for a test, the CONSTRUCTOR will be responsible for all testing costs to prove the work is acceptable.

F. The CONSTRUCTOR shall assist the OWNER’S testing agency, the balancer and the Commissioning Agent by providing personnel and equipment as required to allow for proper access to and inspection of areas to be tested.

G. The CONSTRUCTOR shall provide suitable reference and control points to allow the testing company to identify the exact location and elevation of the test being performed.

H. Testing does not relieve CONSTRUCTOR of his duty to perform work to contract requirements.

I. Retesting required because of nonconformance to specified requirements

shall be performed by the same independent firm on instructions by the CPM. Payment for retesting will be charged to the CONSTRUCTOR by deducting testing charges from the Contract Price via PR.

1.4 MANUFACTURERS’ FIELD SERVICES

1. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment and test, adjust and balance of equipment as applicable, and to initiate instructions when necessary. Services to be scheduled a minimum of one week in advance with the CPM.
2. Submit qualifications of observer to DESIGN PROFESSIONAL thirty (30) days in advance of required observations. Observer subject to approval of DESIGN PROFESSIONAL.
3. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.

1.5 STATE FIRE MARSHALL

UNI projects are subject to review and code inspection by the State Fire Marshall’s office. The CONSTRUCTOR is responsible for scheduling all required inspections. All fees will be paid by UNI except for reinspections due to failed inspections. Refer to Project Requirements for additional specific requirements, if any.

1.6 STATE ELECTRICAL INSPECTOR

UNI projects are subject to review and code inspection by the State Electrical Inspector’s office. The CONSTRUCTOR is responsible for scheduling all required inspections. All fees will be paid by the CONSTRUCTOR.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

1. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
2. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
3. Examine and verify specific conditions described in individual specification sections.
4. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

1. Clean substrate surfaces prior to applying next material or substance.
2. Seal cracks or openings of substrate prior to applying next material or substance.

3.3 SPECIAL INSPECTIONS

A. The OWNER will hire a special inspection and testing company to perform all special testing and report them as outlined below and as required by the technical specifications and the DESIGN PROFESSIONAL.

**Soils and Foundations**

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Shallow Foundations | Periodic | Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill. |
| 2. Controlled Structural Fill | Periodic | Perform sieve tests (ASTM D422 & D1140) and modified or standard Proctor tests (ASTM D1557 or ASTM D698) of each source of fill material.Inspect placement, lift thickness and compaction of controlled fill.Test density of each lift of fill by nuclear methods (ASTM D2922)Verify extend and slope of fill placement. |
| 3. Other: Rammed Aggregate Piers | Continuous |  |

**Cast-in-Place Concrete**

|  |  |  |
| --- | --- | --- |
| Item | Frequency | Scope |
| 1. Mix Design | Periodic | Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that withheld from the mix at the plant. |
| 2. Reinforcement  Installation | Periodic | Inspect size, spacing, cover, positioning and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters. |
| 3. Anchor Rods | Continuous | Inspect size, positioning and embedment of anchor rods. Inspect concrete placement and consolidation around anchors. |
| 4. Concrete Placement | Periodic | Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated. |
| 5. Sampling and Testing  Of Concrete | Continuous | Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064). |
| 6. Curing and Protection | Periodic | Inspect curing, cold weather protection and hot weather protection procedures. |
| 7. Moisture in Concrete | Periodic | ASTM F1869 – In all areas where flooring is to be glued to the floor. |

**Precast Concrete**

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Plant Certification/Quality Control Procedures  **\_\_\_\_\_** Fabricator Exempt | Periodic | Verify that manufacturer is a member of PCI and participates in PCI’s quality control program. |
| 2. Erected Precast  Elements | Periodic | Inspect erection of precast concrete including member configuration, connections, welding and grouting. |

**Special Cases**

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Post-installed Anchors | Periodic | Special inspection of post-installed anchors is required for all post-installed anchors indicated on the structural drawings. Other non-structural anchors shown on the architectural drawings will not need inspection.Inspect post-installed anchors in accordance with that product’s current ICC report, as listed on www.icc-es.org. |

**Masonry** Required Inspection Level: \_\_\_\_ 1 \_\_\_\_ 2

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Mixing of Mortar and Grout | Periodic | Inspect proportioning, mixing and retempering of mortar and grout. Inspect mortar and grout specimens and/or prisms prepared for testing. |
| 2. Installation of Masonry | Periodic | Inspect size, layout, bonding and placement of masonry units. |
| 3. Mortar Joints | Periodic | Inspect construction of mortar joints including tooling and filling of head joints. |
| 4. Reinforcement  Installation | Periodic | Inspect placement, positioning and lapping of reinforcing steel.Exceptions: Continuously inspect welding of reinforcing steel (unless welding is done within an AISC Certified shop). |
| 5. Grouting Operations | Periodic | Verify grout space is clean prior to grouting. Inspect placement and consolidation of grout. Inspect masonry clean-outs for high-lift grouting. |
| 6. Weather Protection | Periodic | Inspect cold weather protection and hot weather protection procedures. Verify that wall cavities are protected against precipitation. |
| 7. Evaluation of Masonry Strength | Periodic | Test compressive strength of mortar and grout cube samples (ASTM C780). |
| 8. Anchors and Ties | Periodic | Inspect size, location, spacing and embedment of dowels, anchors and ties. |

**Structural Steel**

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Fabricator Certification/ Quality Control  Procedures \_\_\_\_ Fabricator Exempt | Periodic | Review shop fabrication and quality control procedures. |
| 2. Material Certification | Periodic | Review certified mill test reports and identification markings on wide-flange shapes, high-strength bolts, nuts and welding electrodes. |
| 3. Open Web Steel Joists | Periodic | Verify that manufacturer is a member of SJI and participates in their quality control program. |
| 4. Bolting | Periodic | Inspect installation and tightening of high-strength bolts. Verify that splines have separated from tension control bolts. Verify proper tightening sequence. Continuous inspection of bolts in slip-critical connections. |
| 5. Welding | Periodic | Visually inspect all welds. Inspect pre-heat, post-heat and surface preparation between passes. Verify size and length of fillet welds. Ultrasonic testing of all full-penetration welds. Exceptions: welding of single pass fillet welds <5/16, railing systems, light gage metal studs is periodic. |
| 6. Shear Connectors | Periodic | Inspect size, number, positioning and welding of shear connectors. Inspect suds for full 360 degree flash. Ring test all shear connectors with a 3 lb. hammer. Bend test all questionable studs to 15 degrees. |
| 7. Structural Details | Periodic | Inspect steel frame for compliance with structural drawings, including bracing, member configuration and connection details. |
| 8. Metal Deck | Periodic | Inspect welding and side-lap fastening of metal roof and floor deck. |

Spray-Applied Fire Resistant Material

|  |  |  |
| --- | --- | --- |
| **Item** | **Frequency** | **Scope** |
| 1. Material Specifications |  |  |
| 2. Laboratory Tested Fire Resistance Design |  | Review UL fire resistive design for each rated beam, column, or assembly. |
| 3. Schedule of Thickness | Periodic | Review approved thickness schedule. |
| 4. Surface Preparation | Periodic | Inspect surface preparation of steel prior to application of fireproofing. |
| 5. Thickness | Periodic | Test thickness of fireproofing (ASTM E605). Perform a set of thickness measurements for every 1,000 SF of floor and roof assemblies and on not less than 25% of rated beams and columns. |
| 6. Bond Strength | Periodic | Test the cohesive/adhesive bond strength of fireproofing (ASTM E736). Perform not less than one test for each 10,000 SF. |

END OF SECTION

## 01 50 00 TEMPORARY FACILITIES AND CONTROLS 01 50 00

PART 1 GENERAL

1.1 CONSTRUCTION AREA

1. It is the intent of the OWNER to keep the construction area as inconspicuous as possible and the campus attractive and pleasant for the public and students. The CONSTRUCTOR’S understanding of this policy and cooperation in carrying it out is vital to the successful promotion and preservation of the OWNER’S property. Specific requirements are contained throughout the Contract Documents that govern use of the site.
2. The CONSTRUCTOR shall limit his construction activities, including materials storage, to the areas shown on the drawings or otherwise designated in writing by the CPM. CONSTRUCTOR personnel may not enter or use buildings or facilities adjacent to the construction site. Where the project requires work within an existing building, CONSTRUCTOR personnel shall be limited to the construction area designated. The CONSTRUCTOR shall maintain all facility exits and passageways in a continually usable condition and promptly inform the CPM of any activities that may interfere with exits or passageways. Dust, dirt and odors from construction operation shall be separated from the occupied areas and directed to the exterior.
3. Smoking, tobacco, or e-cigarette use is not permitted anywhere on campus. There is a $50 fine for anyone caught smoking or using tobacco.
4. Limited remote storage areas on campus may be available for storage trailers or bulk material storage. Verify availability with the OWNER, prior to bidding.
5. There are no areas on campus available for storage or disposal of excess excavated material. All excess dirt shall be removed from campus.
6. Any excavated material stock piled within the construction limits for use on the project shall be protected and maintained in a way to prevent dust or dirt from leaving the site. All stockpiles must be stabilized to comply with SWPPP and NPDES requirements. After 14 days stockpiles must be seeded.
7. The OWNER reserves the right to have work done to comply with these site and maintenance standards if the CONSTRUCTOR fails to respond to requests from the CPM the same day. Costs to perform this work will be deducted from the Contract by Change Order in accordance with the fee schedule at the end of this section.

H. All gas, oil and fuel tanks and vehicle fueling and maintenance areas shall be isolated from all storm drains and capable of containing any spill.

I. Provide a plastic lined or other impervious area on site for concrete truck washout. All excess concrete and mortar must be disposed of in this pit and removed on completion of the work.

1.2 UNDERGROUND UTILITIES

1. The CONSTRUCTOR shall contact Iowa One Call for both on campus and off campus utility location services a minimum of forty-eight (48) hours prior to starting the Project (excluding weekends and holidays), in accordance with Institution Requirements. The CONSTRUCTOR shall comply with all standard Iowa One Call procedures for remarking and maintenance.

B. Any utility damaged by the CONSTRUCTOR shall be repaired immediately at no cost to the OWNER. Repairs shall be continuous until service is restored.

C. The CONSTRUCTOR shall document the location and elevation of all utilities uncovered during the course of the work, and include their locations on the record documents.

D. No utility shall be shutdown by the CONSTRUCTOR. Shutdowns require a minimum two week advance notice minimum. Certain utilities will require long term notification based on service. The OWNER will perform all utility shutdowns and restarts.

1. The CONSTRUCTOR shall not assume that all utilities are shown on the drawings.

F. The CONSTRUCTOR shall keep record of the location of all utilities uncovered whether active or abandoned and notify the CPM each time a utility is uncovered. All utilities shall be recorded on record documents.

G. A separate set of utility record documents shall be provided to the OWNER on completion of all utility work or one month prior to substantial completion whichever comes first.

\* \* 1.3 TEMPORARY ELECTRICITY

1. Cost: By OWNER; CONSTRUCTOR to connect to OWNER’S existing power service where directed by OWNER. Do not disrupt OWNER’S use of service. OWNER will only pay cost of energy used. Exercise measures to conserve energy. For new buildings and projects not located within an existing UNI building, the CONSTRUCTOR shall install a new temporary electric service and be responsible for all costs.
2. Provide temporary electric feeder from existing building electrical service at location as directed. Do not disrupt OWNER’S use of service.
3. Complement existing power service capacity and characteristics as required.
4. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
5. Provide main service disconnect and over-current protection at convenient location.
6. Permanent convenience receptacles may be utilized during construction. If systems are damaged, CONSTRUCTOR shall replace at no cost to OWNER.

\* \* 1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

1. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq.ft. Provide additional lighting for review of drywall and paint operations.
2. Provide and maintain 1 watt/sq.ft. H.I.D. lighting to exterior staging and storage space areas after dark for security purposes.
3. Provide and maintain 0.25 watt/sq.ft. H.I.D. lighting to interior work areas after dark for security purposes.
4. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
5. Maintain lighting and provide routine repairs.
6. Permanent building lighting may be utilized during construction, if authorized by the CPM.

\* \* 1.5 TEMPORARY HEATING/COOLING

 (Verify what is available with Design & Construction)

1. Provide and pay for heating/cooling and other devices as needed to heat or air condition and humidify or dehumidify the space as needed to maintain specified conditions for construction operations.

B. Existing or new permanent equipment may only be used after all dirt and dust creating operations are complete. The DESIGN PROFESSIONAL and CPM must approve in writing use of permanent building equipment. Regardless of date of start up, a warranty for one year must be provided from the date of Substantial Completion. The CONSTRUCTOR is responsible for purchasing extended warranties as required to cover the additional time that may be required for proper finishing of the space, testing and commissioning of the equipment and building flush out.

1. Prior to operation of permanent equipment for temporary heating/cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation and maintenance of worn or consumed parts. Prevent return air from entering the system. Replace all filters monthly or more frequently once it is in use until final acceptance. Service all equipment used and replace all filters as part of punchlist. (See 01 50 00 1.28) The CONSTRUCTOR is responsible for any damage to the equipment.

\* \* 1.6 TEMPORARY VENTILATION

1. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases. If required, provide dehumidification as needed to maintain proper conditions.
2. Provide separate ventilation equipment, do not use building systems. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations. See 01 50 00 1.29 for maintenance requirements.
3. Hazardous or noxious gases shall be exhausted to the exterior of the building. Do not exhaust any ventilation equipment near pedestrian access or walkways.

 1.7 TELEPHONE/FACSIMILE SERVICE

1. Phone lines for telephone facsimile or internet service may be available. Contact UNI Voice Services at 273-7778 to coordinate installation and billing.

\*\* 1.8 WIRELESS

A. If access to the OWNER’S wireless system is available the CONSTRUCTOR may use it and coordinate payment with IT Services. If boosters or additional work is required for the connection, the CONSTRUCTOR is responsible for the cost.

B. Provide, maintain and pay for internet connection and email service to field office. UNI will not provide network connections for internet use, however, if available an additional phone line could be provided.

\* \* 1.9 TEMPORARY WATER SERVICE

1. Connect to existing UNI water source for construction operations at time of project mobilization. OWNER will pay cost of water used. Exercise measures to conserve water. OWNER will indicate area of connection.
2. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing as needed.
3. OWNER has a limited supply of metered water assemblies available for attaching directly to hydrants. Coordinate with CPM and CFU. Constructor shall not operate fire hydrants.
4. Allow 72 hour notice for backflow and meter installation.

\* \* 1.10 TEMPORARY SANITARY FACILITIES

1. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide at time of project mobilization. Temporary facilities must be maintained and located in a manner to minimize potential problems. If the project has a NPDES permit, comply with the BMP established by the plan. Facilities must be located so that if ruptured the contents would be contained and would not enter a drain.

\* \* \* \* \* \* [OR} \* \* \* \* \* \*

1. Existing designated facilities may be used during construction operations. Maintain daily in clean and sanitary condition.
2. At end of construction, return facilities to same or better condition as originally found. Document preconstruction conditions as part of 01 30 00 1.4 D video or photos.

1.11 BARRIERS

1. Provide barriers to prevent unauthorized entry to construction area, to allow for OWNER’S use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
2. Provide barricades and covered walkways to maintain public rights-of-way and for public access to existing building.
3. Provide barriers and warning devices at the edges of all construction operations until conditions are fully restored.
4. Protect vehicular traffic, stored materials, site, and structures from damage.

\*1.12 FENCING

1. Construction: Commercial grade chain link fence with continuous top rail.
2. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Provide key to CPM, or use OWNER provided padlocks. Locate gates as shown on plan or as directed by CPM. Six foot fence shall also be provided at the drip line of all trees. Review fence layout with CPM, prior to installation.
3. Areas designated on the plan shall have a privacy fabric attached to the fence. The CONSTRUCTOR shall furnish and install the fabric and remove the fabric and fence on completion of the project. All fences with fabric must have a continuous top rail.
4. Maintain all fence lines in a straight and neat condition. Adjust and repair damage as needed.

1.13 CONSTRUCTION SIGNAGE

A. When a construction project blocks or interferes with any campus access, road or sidewalk, the CONSTRUCTOR shall provide temporary construction signage directing people around the obstruction and provide suitable descriptions. Signs shall be at least 2’ x 3’ and located as directed by the CPM. Signs shall indicate names of nearby buildings and directions to get to the building.

1. CONSTRUCTOR shall install project signs. Project signs will be purchased by UNI, CONSTRUCTOR shall pick up sign, provide suitable supports and install in location as directed by the CPM.
2. No additional signage is permitted. No signage shall include the name of the CONSTRUCTOR(S).

1.14 WATER CONTROL

1. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment. Do not discharge sediment laden water on to paved surfaces or into storm water systems. Protect all inlets as required by SWPPP and NPDES.
2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.15 DUST CONTROL

A. During dry periods when soil dries out and excess dust accumulates within the construction site, the CONSTRUCTOR shall take appropriate measures to reduce dust and prevent dust from leaving the construction area.

1.16 EXTERIOR ENCLOSURES

1. Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
2. Provide keys for all locks to the CPM or use padlocks supplied by the OWNER.

1.17 INTERIOR ENCLOSURES

1. Provide temporary partitions and ceilings as required to separate work areas from OWNER occupied areas, to prevent penetration of dust, fumes and moisture into OWNER occupied areas, and to prevent damage to existing materials and equipment. Maintain and repair partitions as needed to maintain adequate separation.
2. Construction entrance and exit shall be separate from normal building exits, consult with CPM and DESIGN PROFESSIONAL to coordinate locations.
3. Construction: Framing and reinforced polyethylene and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.
4. Provide dust barriers and other methods as required to separate all construction areas from areas where final finishes are being installed.

1.18 PROTECTION OF INSTALLED AND EXISTING WORK

1. Protect installed and existing work and provide special protection where specified in individual specification sections.
2. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
3. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
4. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials, plywood or other measures as required. This includes concrete that will serve as the finished surface or concrete that will be stained. Stained or damaged concrete that serves as a finish surface will be removed and replaced.
5. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer. As a minimum, provide a layer of separation material and a layer of rigid walkway or work surface.
6. Prohibit traffic from landscaped areas.

1.19 SECURITY

1. Provide security and facilities to protect work, existing facilities, and OWNER’S operations from unauthorized entry, vandalism, or theft.
2. Coordinate with OWNER’S security program.

C. Provide keys for all CONSTRUCTOR supplied locks to CPM or provide padlocks that will accept OWNER’S construction cores. If available the CPM can provide padlocks with construction cores.

1.20 EXISTING FACILITIES

1. Prior to the start of construction, the CONSTRUCTOR’S superintendent shall inspect the construction area and paths of travel to and from the area. If damage exists the CONSTRUCTOR shall notify the CPM and they will photograph or otherwise document conditions and existing damages if any. If no damage is reported the existing facilities will be considered to be in good undamaged condition. The CONSTRUCTOR will be responsible for repair of all damage to existing facilities prior to project closeout. Provide the CPM with one copy of the damage documentation.
2. The CONSTRUCTOR is responsible for maintenance, protection and restoration of the site and structures within the construction area and areas crossed over in transit to or from the construction area. All facilities shall be restored to original or better condition at completion of the work.
3. Protect underground utilities, tunnels and other structures from heavy equipment traffic and storage of heavy materials. Damage to any existing utility or structure shall be repaired by the CONSTRUCTOR at no expense to the OWNER. If existing utilities or structures are found that are not shown on the drawings, stop work immediately and contact the CPM.

The CONSTRUCTOR shall not operate any valve, switch or contact on any existing utility without prior approval of the OWNER. Generally UNI employees will open and close all utilities.

1. Lawn and landscape areas within the confines of the CONSTRUCTOR’S operations and along both sides of fence lines shall be maintained on a weekly basis to maintain an appearance similar to the surrounding area. If the area is not maintained, the OWNER reserves the right to give twenty-four (24) hours notice of the problem and then maintain the site and deduct cost from the Contract.
2. Any tree, shrubbery or planting damaged during construction shall be replaced by the CONSTRUCTOR at no cost to the OWNER.
3. No material shall be stored or vehicles parked within the drip line of trees that are to remain. All trees within the construction limits shall be protected by six foot high commercial grade chain link fence. Fence shall be placed at the drip line of all trees, review location with CPM.
4. Trash shall be disposed of regularly and not allowed to accumulate on site. The site shall be cleaned at least weekly of all trash, debris and construction material.

1.21 FIRE PROTECTION

1. CONSTRUCTOR shall familiarize himself with OWNER’S existing fire protection facilities including alarms, sprinkler systems and extinguishers.
2. Existing fire alarm systems shall be maintained in operation throughout the project unless agreed to in writing by the OWNER. Temporarily cover and protect all smoke detectors in demolition areas to prevent accidental activation and false alarms. Covers shall be removed at the end of the work days and replaced the next day if needed. CONSTRUCTOR shall notify UNI Police (273-2712) and the CPM prior to covering any detectors.

1. Any false alarms or unintentional activation of alarm systems shall be reported to UNI Police (273-2712) immediately or CONSTRUCTOR will be responsible for costs in responding to the alarm.

D. Provide fire extinguishers to meet OSHA and International Fire Code requirements or a minimum of two (2) U.L. listed multipurpose dry chemical fire extinguishers per floor or work area, in addition to OWNER’S facilities. The CONSTRUCTOR shall replace the OWNER’S extinguishers for the duration of the construction project. The OWNER’S extinguishers shall be set aside for removal by OWNER. Each extinguisher shall be rated 2A20BC. Additional extinguishers may be provided to meet CONSTRUCTOR’S safety requirements.

E. Observe all normal fire safety practices.

F. Provide shields for all welding, cutting, burning, grinding or other spark producing activity.

1. Provide fireproof blankets or tarps as needed to protect existing and new facilities.
2. Provide fire watch personnel as needed to watch for falling sparks.

I. Observe all necessary safety precautions for flammable/volatile fluids. Do not store them in the construction area.

J. Review use and protection of existing sprinkler and alarm systems.

K. CONSTRUCTOR to coordinate efforts with the approved fire safety and rescue plan. (01 10 00, 1.4.1)

L. A CONSTRUCTOR must follow the University of Northern Iowa’s Office of Risk Management and Environmental Health and Safety’s Hot Works Program which is defined at <https://risk.uni.edu/hot-work> or the CONSTRUCTOR’S Hot Work Permit System must be approved by the Office of Risk Management and Environmental Health and Safety.

1.22 SAFETY

A. The CONSTRUCTOR shall observe all safety laws and regulations as noted in the General Conditions.

B. The OWNER has a lock-out tag-out (LOTO) and confined space (CS) procedures that the CONSTRUCTOR must be familiar with. Any operations that require LOTO or CS shall be coordinated with OWNER. Contact the CPM to coordinate review of these procedures.

C. When working in existing facilities, the CONSTRUCTOR can review SDS sheets for any hazardous material in the building by contacting the University Safety office.

\* \* 1.23 ACCESS ROADS/SITE TRAFFIC

1. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
2. Extend and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.
3. Provide and maintain access to fire hydrants, free of obstructions.
4. Provide stone tire cleaners or other means of removing mud from vehicle wheels before entering streets. Tire cleaners shall be cleaned and refreshed regularly to keep dirt from being carried off site. Any mud inadvertently carried off site shall be removed immediately. Streets shall be broom cleaned and scraped to remove all dirt. Protect all inlets in the area.
5. If the streets are not cleaned by 3:00 p.m., the OWNER will have the streets cleaned and the costs will be deducted from the Contract according to the schedule in Item 1.31 of this section.
6. The CPM shall designate existing on-site roads that may be used for construction traffic.

1.24 PARKING

1. No parking on grass.

B. No parking on sidewalks.

C. All vehicles must be permitted through UNI Public Safety and park in an assigned lot per the plans. No parking will be allowed at the site unless approved by Public Safety and the CPM. Vehicles parked at the site still require a permit. Permits are available yearly, weekly or daily at varying costs as established by Public Safety.

1. Parking tickets will be issued to illegally parked vehicles.

1.25 PROGRESS CLEANING AND WASTE REMOVAL

1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Cleaning shall be done daily and shall include sweeping to remove all dust and dirt.
2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
3. Broom, vacuum and wipe clean all interior areas prior to start of surface finishing, and continue cleaning to maintain area being finished free of dust.
4. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
5. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate covered containers.
6. If the Project or project site is not maintained in a clean condition, the OWNER reserves the right to have cleaning done. Costs will be deducted from the contract in accordance with General Conditions. All debris and discarded items shall be cleaned from the site weekly.
7. When excavation and earthwork or other construction activities causes muddy conditions on site, provisions shall be made to prevent mud from being carried off site. Any mud inadvertently carried beyond the construction limits shall be cleaned immediately and additional provisions made to prevent that from reoccurring.
8. Stone tire cleaners or other methods of tire cleaning shall be employed at each entrance and shall be refreshed and reworked every time mud starts getting carried off of the construction site.

I. The CONSTRUCTOR shall monitor and adjust site conditions to prevent wind erosion and dust from leaving the construction area.

J. If the CONSTRUCTOR fails to maintain the area adjacent to the site in a clean condition, the OWNER reserves the right to clean the area and charge the CONSTRUCTOR according to the fee schedule established in this section.

\* \* 1.26 FIELD OFFICES AND SHEDS

1. Use and location of temporary offices, sheds and trailers must be approved by the OWNER.
2. Locate offices and sheds as directed by OWNER within the construction area as noted on the plans.
3. The CONSTRUCTOR shall maintain a set of as-built documents in his field office that reflects all changes made to the documents. These documents shall be available to the CPM during construction and shall be turned over to the OWNER with the request for Substantial Completion.

1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROL

1. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
2. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
3. Clean and repair damage caused by installation, use or removal of temporary work.
4. Review entire construction area and access with CPM to determine extent of damage and repairs required.
5. Restore existing and permanent facilities used during construction to original or better condition. Restore new permanent facilities used during construction to specified condition.

F. If allowed by UNI Design & Construction, permanent building equipment may be used during construction. If allowed it must be cleaned and all filters and disposable parts replaced. Each item used during construction shall be maintained, lubricated, adjusted and inspected by the CONSTRUCTOR and manufacturer’s representative prior to turning the building over. A statement from the manufacturer indicating the condition of the equipment and noting the parts that were replaced and service provided shall be submitted to the CPM. The CONSTRUCTOR shall maintain a list of equipment used during construction and note the day it was placed in service and each time it was serviced and filters replaced and provide to CPM. In addition one year shall be added to the warranty period starting on acceptance of the building as substantially complete.

1.28 SEDIMENT AND EROSION CONTROL

UNI has a general NPDES permit that covers all campus in addition to special project permits for specific projects.

Prior to the start of construction or any earth moving activities the CONSTRUCTOR shall implement the storm water pollution prevention plan (included in these documents) and install the associated sediment and erosion controls. When a specific project permit is required the CONSTRUCTOR shall also sign the certification statement and become a co-permittee, as a co-permittee the CONSTRUCTOR will be responsible for implementing and maintaining all requirements of the permit. The control measures shall be implemented by experienced workers in accordance with the NPDES permit, and the technical specifications.

The CONSTRUCTOR’S superintendent shall inspect and maintain the protective measures a minimum of once every 7 days and after every rain or snow melt. The inspection must include all disturbed areas of the site; areas of material storage, locations where vehicles enter and exit the site, and all of the sediment and erosion controls that were installed must be inspected.

The inspector must prepare a written report summarizing his inspection. It shall include as a minimum

1. The name and qualifications of the person making the inspection.
2. The date of the inspection.
3. Identify any damages or deficiencies in the control measures.
4. Identify actions taken to correct the problems found.
5. Identify what actions will be taken to modify procedures.
6. Include the following certification statement signed by an officer of the contracting company.

Inspection Report Certification Statement

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed and certified copies of these reports shall be submitted to the CPM. Payments will be withheld if inspection reports are not current.

Maintenance of required controls and facilities shall be recorded. This can be accomplished on the periodic reports. The CONSTRUCTOR shall also keep a log of construction activity on site including:

1. The dates when major grading activities occur.
2. The dates when construction activity ceases in an area and if it is temporary or permanent.
3. The dates when an area is stabilized either temporarily or permanently.

Copies of these records shall be provided to the CPM on a monthly basis, with the application for payment and the updated schedule.

If the Storm Water Pollution Prevention plan is not working the CONSTRUCTOR shall work with the DESIGN PROFESSIONAL to immediately address the defects and make corrections to the plan as needed. The CONSTRUCTOR shall be responsible for complying with all requirements of the plan and regulations.

The CONSTRUCTOR is liable for all fines or penalties levied against the OWNER due to violation of NPDES regulations and environmental requirements due to construction activities. The CONSTRUCTOR shall report any hazardous condition in accordance with Iowa law.

The CONSTRUCTOR shall maintain all sediment and erosion control measures in place until the site is stabilized and approved.

At project closeout the CONSTRUCTOR shall furnish a complete set of documents covering inspections, maintenance, construction activities and a copy of the Notice of Discontinuation for the project to the CPM.

1.29 FEE SCHEDULE

 First Violation $ 500.00/ea.

 Second Violation $1,000.00/ea.

 Subsequent Violations $2,000.00/ea. or per day

The above fees apply to all violations of NPDES permits including but not limited to the following;

 Dirt on street.

 Concrete truck washout not in approved area.

 Failure to provide stabilization.

 Failure to inspect and report.

 Failure to protect inlets.

Failure to provide temporary stabilization of stockpiles and inactive areas.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

 Not Used.

END OF SECTION

# 01 60 00 PRODUCT REQUIREMENTS 01 60 00

PART 1 GENERAL

1.1 PRODUCTS

1. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
2. Provide interchangeable components of the same manufacturer for components being replaced.

1.2 TRANSPORTATION AND HANDLING

1. Transport and handle products in accordance with manufacturer’s instructions.

B. CONSTRUCTOR shall be responsible for receiving all shipments of materials to the job site. Shipments will not be accepted by OWNER.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.3 STORAGE AND PROTECTION

1. Store and protect product in accordance with manufacturer’s instructions.
2. Store with seals and labels intact and legible.
3. Store all hazardous or potentially hazardous materials with provision for secondary containment to prevent pollution of ground or water. Provide SDS sheets to CPM through submittal process and maintain copy on site.
4. Store sensitive products in weathertight, climate controlled enclosures in an environment favorable to product.
5. For exterior storage of fabricated products, place on sloped supports above ground.
6. Provide off-site storage and protection when site does not permit on-site storage or protection.
7. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
8. Store loose granular materials on solid flat surface in a well-drained area. Prevent mixing with foreign matter.
9. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
10. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.4 PRODUCT OPTIONS

1. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
2. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
3. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.
4. Products specified by naming one manufacturer as the basis of design with other manufacturers as potential acceptable alternates. Products of other manufacturers must be approved to be equal to the basis of design product.

1.5 SUBSTITUTIONS

1. DESIGN PROFESSIONAL will consider requests for Substitutions only prior to bid as outlined in Article 12 of Instructions to Bidder.
2. After receipt of bids, substitutions may be considered when a Product becomes unavailable through no fault of the CONSTRUCTOR or if it is an advantage, in cost and/or time, to the OWNER.
3. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
4. A request constitutes a representation that the CONSTRUCTOR:
5. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
6. Will provide the same warranty for the Substitution as for the specified Product.
7. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to OWNER.
8. Waives claims for additional costs or time extension which may subsequently become apparent.
9. Will reimburse OWNER and DESIGN PROFESSIONAL for review or redesign services associated with re-approval by authorities.
10. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. If substitutions are made on shop drawings without formal notification and request, the CONSTRUCTOR will be liable for removal and replacement with originally specified product.

 G. Proposed Post Bid Substitution Submittal Procedure;

1. Submit three (3) copies of request for Substitution, two (2) copies to DESIGN PROFESSIONAL and one (1) copy to OWNER, for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on CONSTRUCTOR.
3. Indicate advantage to OWNER if substitution is allowed, including cost and/or time savings.
4. The DESIGN PROFESSIONAL will notify CONSTRUCTOR in writing of decision to accept or reject request.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

 Not Used.

END OF SECTION

# 01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS 01 70 00

PART 1 GENERAL

1.1 SUBMITTALS

A. Submit documents as described in each article in the Section referring the Closeout, Substantial Completion and Final Completion.

1.2 PROJECT RECORD DOCUMENTS

1. Maintain one set of the following record documents; record actual revisions to the work:

1. Drawings.

2. Specifications – indicate actual material used.

3. Change Orders and other modifications to the Contract including RFI’s, PR’s, IDC’s and SI’s.

4. Required documentation for NPDES.

5. Changes to submittals.

1. Ensure entries are complete and accurate, enabling future reference by OWNER.
2. Record information on Construction Set Documents concurrent with construction progress.
3. Specification: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer’s name and product model and number.

2. Product substitutions or alternates utilized.

1. Record Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.

4. Field changes of dimension and detail.

5. Details not on original Contract drawings.

6. Record in detail all clarifications and changes that have occurred throughout the course of the project. Written description are not adequate, drawings should be marked graphically.

F. Submit all record documents to CPM prior to request for substantial completion inspection.

1.3 OPERATION AND MAINTENANCE MANUALS

A. The CONSTRUCTOR shall provide Operation and Maintenance Manuals for all equipment and materials furnished on the project as follows:

1. The initial electronic PDF format Operation and Maintenance Manuals shall be published to Trimble Unity Construct by specification section as a submittal at least 60 days prior to substantial completion for review by the OWNER and DESIGN PROFESSIONAL. The corrected Operation and Maintenance Manuals must be provided before the project will be considered substantially complete.

2. After review by the OWNER and DESIGN PROFESSIONAL, the Operation and Maintenance Manuals shall be revised to incorporate any review comments received on the initial electronic copy and a final copy published to Trimble Unity Construct. The final copy must be provided prior to substantial completion.

3. A separate hard copy volume titled “Warranties” with original properly executed warranty documents for all equipment and materials for which warranties are required, shall be provided. The warranty volume must be provided prior to final acceptance. Post to Trimble Unity Construct by specification section.

B. Maintenance manuals shall include full maintenance and operating instructions, warranty information, parts lists, wiring diagrams, recommended spare parts and emergency parts inventory, sources of purchase and similar information compiled in Adobe Acrobat Portable Document Format (PDF) by specification section.

C. The Warranties Volume must be organized based on the Table of Contents in the Project Manual and bound into a heavy duty three ring binder (maximum size 3”). Page size should be 8.5” x 11”. A copy of the “Warranty” volume shall be published to Trimble Unity Construct in PDF format by specification sections.

D. The Operation and Maintenance Manuals are to be organized in PDF format by specification section.

1. The manual shall be created from the native electronic files using the latest available release of Adobe Acrobat. If native electronic files are not available convert to electronic format via scanning of printed material.

1.4 COMMISSIONING MANUAL (for small project without commissioning agents. For large projects use 01 81 00)

A. Commissioning Forms (without Cx)

1. Commissioning forms are available at UNI Facilities Management website at <https://fm.uni.edu/constructor-information>

B. Submit information bound in 3 ring binders of appropriate size with durable plastic covers.

C. Prepare a table of contents.

 1. UNI standard commissioning forms.

 2. Record of all required testing.

 3. Attendance sheets for all CONSTRUCTORS provided training.

 4. Cover up review sheets.

D. Each section to be separated by tabs.

E. Submit a copy electronically on Trimble Unity Construct 90 days prior to request for substantial completion.

1.5 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products in quantities specified in individual specification sections.

(Insert List)

B. Deliver to project site: Prepare a receipt form for signature of CPM.

C. All materials shall be delivered to a designated location and turned over to CPM prior to substantial completion.

D. Include copies of all signed receipts with the closeout documents.

1.6 WARRANTIES AND BONDS

1. Provide one (1) notarized copy.
2. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
3. Provide Table of Contents and assemble in suitable binder of appropriate size with durable plastic cover.
4. Submit prior to final Application for Payment.
5. For items of work not accepted at Substantial Completion, list date of acceptance as start of warranty period.
6. All warranties shall start on the date of substantial completion. If certain items are not considered complete the warranty shall start when they are complete.

1.7 OWNER OCCUPANCY

A. The date identified in the contract is critical to the OWNER’S use of the facility. If an inspection is made and the project is not determined to be substantially complete the OWNER may still use or occupy all or a portion of the facility as needed to maintain its operations. The list of incomplete items will be issued to record conditions prior to OWNER occupancy. An agreement will be made between the OWNER and CONSTRUCTOR outlining the responsibilities assigned to each of them for payments, retainage, security, maintenance, heat utilities, damage to the work and insurance.

B. The CONSTRUCTOR shall continue to complete the work and items contained on the observation report. When the CONSTRUCTOR feels that he has completed the punchlist or the work has progressed to the point where he believes it to be substantially complete he should review and sign off all items that he believes are complete and request a final inspection. The CONSTRUCTOR should continue to complete the work while the OWNER and DESIGN PROFESSIONAL schedule and conduct a final observation.

C. When the OWNER and DESIGN PROFESSIONAL have completed their observation and found the project to be substantially complete a Certificate of Substantial Completion will be issued with the punchlist attached of items to be corrected.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTE

3.1 CUTTING AND PATCHING

A. The CONSTRUCTOR shall be responsible for cutting and patching surfaces to make the work fit in accordance with General Conditions.

B. Employ skilled and experienced installer to perform cutting and patching.

C. Submit written request in advance of cutting or altering elements which affect:

1. Structural integrity of element. All beams, columns or other structural elements must be reviewed by the DESIGN PROFESSIONAL prior to cutting. A Professional Engineer shall report on the modifications and determine if the element needs to be reinforced.

2. Integrity of weather-exposed or moisture-resistant elements.

3. Efficiency, maintenance, or safety of element.

4. Visual qualities of sight exposed elements.

5. Work of OWNER or separate CONSTRUCTOR.

D. Execute cutting, fitting and patching including excavation and fill, to complete work, and to:

 1. Fit the several parts together, to integrate with other work.

 2. Uncover Work to install or correct ill-timed work.

 3. Remove and replace defective and nonconforming work.

 4. Remove samples of installed Work for testing.

5. Provide openings in elements of work for penetrations of mechanical and electrical work.

E. Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

F. Cut masonry and concrete materials using masonry saw or core drill. Use wet cutting methods in buildings to reduce dust.

G. Cutting Structural Elements: Do not cut structural elements unless directed to do so. Do not cut or patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio. Provide shoring as necessary to protect structural elements or portions thereof which are not scheduled to be cut or removed.

H. Cutting Operating and Safety Elements: Do not cut or patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

I. Restore Work with new products in accordance with requirements of Contract Documents.

J. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Provide fire rated or sound rated seals where required.

K. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

L. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

M. Identify hazardous substances or conditions exposed during the Work to the DESIGN PROFESSIONAL and CPM for decision or remedy.

3.2 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product sections; match existing Products and Work for patching and extending work.

B. Employ skilled and experienced installer to perform alteration Work.

C. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

D. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original condition.

E. Utilities

 1. Protect existing utilities to remain from damage.

2. Do not disrupt operating utilities without written permission from the OWNER.

3. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to OWNER. Obtain permission from OWNER before modifying or disabling life safety system including exit pathways.

4. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 7 days prior written notification to OWNER. CPM will confirm when utilities can be shut down and for how long.

5. Locate and mark utilities to remain; mark using highly visible tags or flags, protect from damage due to subsequent construction, using substantial barricades if necessary.

a. At utilities or ductwork to be permanently capped and abandoned, provide a permanent type tag (metal or plastic) attached to the duct, pipe, conduit, etc. near the cap and containing the following information:

1) Utility carried (e.g. gas, hot water, return air, 240 V electrical, etc.)

2) Original source.

3) Original destination.

4) Note to which (if either) it is still connected.

5) Note whether the pipe, conduit or duct is active or contains anything.

6) Date capped.

b. Utilities or ductwork to be temporarily capped may be tagged with less permanent tags (paper) but must carry the same information.

6. Remove all piping, valves, meters, equipment, and supports of disconnected and abandoned utilities where possible to do so.

F. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition of each material, with a transition to adjacent finishes.

G. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent work in texture and appearance.

H. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to DESIGN PROFESSIONAL or CPM for review.

I. Where a change of plane of ¼ - inch (6 mm) or more occurs, submit recommendation for providing a smooth transition; to DESIGN PROFESSIONAL or CPM for review.

J. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

 K. Finish surfaces as specified in individual Product sections.

3.3 ANCHORING

A. Provide anchors appropriate for the substrate, for anchored material or object and for loads which can be reasonably anticipated.

B. Do not anchor new items or new construction to existing construction in a way that will place an excessive load on the existing construction.

 C. Plaster and Gypsum Board

1. Do not anchor anything directly to gypsum board or plastic, always anchor to the framing system or substrate to which the gypsum board or plaster is anchored. If necessary open the gypsum board or plaster wall, provide additional blocking and repair the surface.

 D. Hollow Masonry

1. Do not anchor anything weighing more than 1 pound or capable of resulting in pressure being applied of more than 3 pounds in any direction to the face of hollow masonry.

2. Where loads heavier than those listed above must be anchored to hollow masonry, provide one of the following:

a. Provide grouted core or, if existing, open the core and grout solid at the core into which the anchor is to be placed plus at least one core above and two cores below where the anchor is to be placed. Patch and finish the surface of the block to match surrounding hollow masonry.

b. Provide a system that engages both walls of the hollow masonry and provides a rigid spacer/brace in the core between the walls similar to Hilti HIT HY 20 for Masonry Construction.

3. Under no circumstances use impact driven fasteners on hollow masonry unless the cores are grouted solid.

3.4 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operations.

3.5 FINAL CLEANING

A. Execute final cleaning prior to final project assessment and occupancy. Cleaning shall be performed by a commercial cleaning company to the standard normally expected in office cleaning.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces. Wipe clean all hard surfaces.

C. Scrub clean all hard surface floors, new and existing. Owner will apply coats of S.C. Johnson Carefree – wax/sealer to all newly installed concrete and vinyl floors or existing floors impacted by construction traffic.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Replace filters of operating equipment.

F. Clean inside all ducts & equipment used during construction, review with CPM.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste and surplus materials, rubbish, and construction facilities from the site.

J. Remove all tire marks from curbs and sidewalks.

K. Once the OWNER has occupied all or a part of the project area, all additional required cleaning will be provided by the OWNER, unless specifically noted in the punchlist.

3.6 SUBSTANTIAL COMPLETION

A. For the CONSTRUCTOR to request a Substantial Completion Inspection the following items must be completed:

1. O & M Manuals must have be submitted and reviewed by the DESIGN PROFESSIONAL and OWNER, corrections made and submit 1 printed copy and publish on Trimble Unity Construct.

2. Record marked up drawings, specifications, and submittals must be submitted to the CPM.

3. All dust and dirt shall be cleaned from construction areas before equipment is started.

4 All testing and balancing must be complete.

5 The CONSTRUCTOR shall submit a list of items he knows to be incomplete, including the reason they are incomplete and when they will be done.

6. All commissioning and functional Testing must be complete.

7. All OWNER training must be complete.

8. All equipment filters shall be changed to those required for building flush out.

9. A final cleaning as required by Section 3.5 shall occur just before Substantial Completion.

B. The CONSTRUCTOR shall continue his work while the OWNER and DESIGN PROFESSIONAL schedule and conduct a final observation to determine if the work is substantially complete. If the CONSTRUCTOR’S list is not accurate the OWNER may elect to stop inspection until an accurate list is provided.

C. If the CONSTRUCTOR’S list or the inspection contain a significant amount of items that in the opinion of the OWNER and DESIGN PROFESSIONAL cannot be satisfactorily completed in the standard 30 day time frame the project will not be considered to be substantially complete. The inspection may be completed for record purposes but a certificate will not be issued and the warranties will not go into effect. If the project is not substantially complete the CONSTRUCTOR will be responsible for extending all warranties as required to provide the full warranty period from the actual date of substantial completion.

D. If accepted, the DESIGN PROFESSIONAL will provide a certification of substantial completion accompanied by a Punchlist showing items not yet completed or not yet completed satisfactorily.

1. Omission of an item from the Punchist does not relieve CONSTRUCTOR from the requirement to completely conform to the Contract Documents.

3.7 REDUCTION OF RETAINAGE

A. At any time, 30 days or more after Substantial Completion the CONSTRUCTOR can request a Reduction in Retainage based on the amount of work remaining to be completed. The CONSTRUCTOR shall request in writing by submitting a revised Application for Payment, a completed Consent of Surety to Reduction in Retainage form and lien waivers from all subcontractors and an updated copy of the current punchlist with completed items checked off.

B. On receipt of this information the OWNER and DESIGN PROFESSIONAL shall schedule a follow up inspection of punchlist items. On completion of the inspection, an updated punchlist will be prepared with values assigned to all items that have not been satisfactorily completed. Values will be 200% of the estimated cost to complete the time, including OWNER’S cost.

3.8 FINAL INSPECTION

A. Prior to requesting final inspection for certification of final acceptance and final payment complete the following:

1. Submit copy of OWNER’S final Punchlist of work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.

2. One electronic and one paper copy of corrected operation and maintenance manuals including warranties and bonds in final form, incorporating all comments received, within ten (10) days after substantial completion inspection.

3. Submit proof, satisfactory to OWNER, that fees and similar obligations of CONSTRUCTOR have been paid.

4. Submit proof to the OWNER that all keys and control cards for locks and control devices have been delivered to the OWNER.

5. Submit all TSB reporting data.

6. Submit release from the Iowa Department of Revenue if the CONSTRUCTOR is not a resident of the State of Iowa.

7. Deliver tools, spare parts, extra stocks of materials and similar physical items to OWNER. See Division 2 through Division 35 for specific requirements. Provide receipt for CPM to sign acknowledging receipt of the materials with specific quantities.

B. Do not request a Final Inspection until all construction requirements of the Project have been met in conformance with the Contract Documents.

C. CONSTRUCTOR shall submit the following to the DESIGN PROFESSIONAL with request for final inspection:

1. Written certification that Contact Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for DESIGN PROFESSIONAL’S and CPM’s Inspection.

2. Written certification from product manufacturers stating that no asbestos containing materials have been installed in the Project. Statements are required from each manufacturer supplying materials installed on this job including those installed by all sub-contractor and sub-subcontractor.

D. Coordinate schedule of final inspection so that all parties required to view and approve the Work are present.

E. If the Final observation finds that the items were not successfully completed the OWNER and DESIGN PROFESSIONAL will establish a date where all work must be completed. An additional observation will be conducted on that date to verify completion. If the items are still not complete the OWNER reserves the right to complete the punchlist without further notice to the CONSTRUCTOR or their Surety and deduct costs from their payment application.

F. Complete items of work determined by DESIGN PROFESSIONAL’S final inspection to be incomplete or unacceptable and request additional inspections as necessary.

G. Reinspection Costs: Should the OWNER or the DESIGN PROFESSIONAL be required to perform additional Final Inspections because of failure of work to comply with Contract Documents, CONSTRUCTOR shall compensate OWNER and/or DESIGN PROFESSIONAL for Additional services. OWNER may deduct the cost of the inspections from final payment to CONSTRUCTOR.

3.9 FINAL ACCEPTANCE

 A. Submit after final inspection and written acceptance:

1. Project Record Documents with corrections as indicated in review by DESIGN PROFESSIONAL.

2. Two copies of all inspections and certifications required by governing authorities (if not submitted previously).

3. Final Application for Payment, identifying total adjusted Contract Sum, previous payments, and sum remaining due. See Section 01 20 00 for specific requirements.

4. Any other close out documentation not previously submitted.

END OF SECTION

01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL 01 74 19

\* Non-LEED projects.

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. OWNER requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage or recycle as much waste as economically feasible.

D. Required Recycling, Salvage and Reuse: The following may not be disposed of in landfills or by incineration:

 1. Aluminum and plastic beverage containers.

 2. Corrugated cardboard.

 3. Wood pallets.

 4. Clean dimensional wood.

 5. Land clearing debris, including brush, branches, logs and stumps.

6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.

E. Methods of trash/waste disposal that are not acceptable are:

 1. Burning on the project site.

 2. Burying on the project site.

 3. Dumping or burying on other property, public or private.

 4. Other illegal dumping or burying.

F. Regulatory Requirements: CONSTRUCTOR is responsible for knowing and complying with regulatory requirements, including but not limited to federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 SUBMITTALS

A. Construction Waste Management Plan: Prior to commencing demolition or construction activities, the CONSTRUCTOR, with input of all Subcontractors, shall develop and submit a Construction Waste Management Plan within 14 calendar days after Notice to Proceed.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Designate an on-site person or persons responsible for instructing workers and overseeing results of the Waste Management Plan.

B. Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, OWNER and DESIGN PROFESSIONAL.

C. Hazardous Wastes: Separate hazardous wastes and report to OWNER for removal.

D. Recycling: Separate, store, protect and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

E. Reuse of Materials On-Site: Set aside, sort and protect separated products in preparation for reuse.

F. Salvage: Set aside, sort and protect products to be salvaged for reuse off-site.

END OF SECTION

(USE FOR SMALL PROJECT WITHOUT COMMISSIONING)

# 01 75 00 STARTING AND ADJUSTING 01 75 00

PART 1 GENERAL

1.1 STARTING SYSTEMS

1. Coordinate schedule for start-up of equipment and systems with the CPM and DESIGN PROFESSIONAL. The CONSTRUCTOR shall make every effort to combine start ups of various systems and coordinate with regular progress meetings to minimize trips required by the DESIGN PROFESSIONAL.
2. Notify DESIGN PROFESSIONAL and CPM a minimum of seven (7) days prior to start-up of each item.
3. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
4. Verify tests, meter readings, wiring and specified electrical characteristics agree with those required by the equipment or system manufacturer.
5. Verify that support components for equipment are complete and tested.
6. Execute start-up under supervision of applicable manufacturer’s representative in accordance with manufacturers’ instructions.
7. Manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation. Coordinate with CPM.
8. Submit a written report to the CPM that equipment or system has been properly installed and is functioning correctly. Report should include start-up checklist as noted above and any other pertinent information and signature of manufacturer’s representative.
9. Complete the OWNER’S commissioning forms as required for each system.
10. CONSTRUCTOR shall develop a sign off sheet for each piece of equipment that is started, indicate the name of the equipment, date, and a list of all those present for training and startup and whether the equipment was left running or was shut down. CPM, the Area Mechanic and the DESIGN PROFESSIONAL must be present for all start ups. Those present shall complete the OWNER’S standard commissioning form and the OWNER’S equipment maintenance form.
11. Equipment that does not require training according to part 1.2 shall also be started and listed by CONSTRUCTOR.

1.2 DEMONSTRATION AND INSTRUCTIONS

1. Demonstrate operation and maintenance of Products to OWNER’S personnel a minimum of two weeks prior to date of Substantial Completion. Notify CPM and DESIGN PROFESSIONAL a minimum of one week prior to date of instruction, to allow for coordination of affected personnel.
2. Demonstrate project equipment by a qualified manufacturers’ representative who is knowledgeable about the project and knowledgeable about recommended maintenance, testing and trouble shooting.
3. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
4. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with OWNER’S personnel in detail to explain all aspects of operation and maintenance.
5. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time at equipment location. CONSTRUCTOR shall assist UNI personnel with completion of equipment maintenance forms. The form is at the end of this section.
6. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
7. The minimum amount of time required for instruction on each item of equipment and system is that specified in individual sections or as recommended by the manufacturer, whichever is greater.
8. CONSTRUCTOR shall prepare sign-in sheets for each training session listing; project, system, CONSTRUCTOR, manufacturer’s representative, CPM and length of time for training. Each sheet shall be signed and dated by the OWNER and CONSTRUCTOR. All sign-in sheets shall be submitted with O & M manuals.
9. Training shall be provided to designated OWNER personnel for each item or system as noted below. CONSTRUCTOR to furnish sign-in sheet for all attendees to sign. All sign-in sheets shall be submitted with O&M Manuals. (Edit list to suit project)

Electronic Speed Controllers – Testing & troubleshooting procedures.

VAV’s – Testing & troubleshooting procedures.

HVAC Pumps – Recommended maintenance – disassembly procedures.

Water Softeners – Testing, recommended maintenance & troubleshooting procedures.

Building Automation and Automatic Temperature Control Systems Electronic Reheat Valves – Testing & troubleshooting procedures.

Mixing Valves – Troubleshooting procedures.

Thermostatic Mixing Valves – Troubleshooting procedures.

Air Dryers – Recommended maintenance & repair procedures.

Chillers – Sequence of operation, testing, recommended maintenance, and troubleshooting procedures.

Air Handling Units – Recommended maintenance.

Smart Breakers/Lighting Controls – Testing procedures, recommended maintenance, & troubleshooting procedures.

Electric Panels/Breakers/Emergency Panels – Training on physical locations, and what they supply.

Fire Alarm Panels – Training on physical locations, and what they supply. Technology updates where applicable.

Elevators – Recommended maintenance, & testing procedures. Technology updates where applicable.

Generators – Recommended maintenance, & testing procedures. Technology updates where applicable.

De-superheaters – Troubleshooting procedures, recommended settings.

Instantaneous Hot Water Heaters – Recommended maintenance & troubleshooting procedures.

Humidifiers – Recommended maintenance, testing and troubleshooting procedures.

Electric Meters

Sewer Ejector Pumps

Fume Hoods, Kitchen Exhaust, Dust Collectors & Other Specialty Exhaust.

Heat Recovery Systems

Heat Exchangers

1.3 TESTING, ADJUSTING, AND BALANCING

 (Note: review with OWNER on small project balancing can be in the

 contract.)

\* A. OWNER will select and pay for an independent firm to perform testing, adjusting, and balancing.

1. The independent firm will perform services specified in Section 23 05 93.
2. CONSTRUCTOR shall cooperate with and assist balancing firm in performance of their work on a continuous basis, providing personnel and equipment as required to allow for proper access to the work.
3. The mechanical, electrical and controls CONSTRUCTORs shall each have a representative available to the balancing CONSTRUCTOR full time for a minimum of two days as selected by the balancing CONSTRUCTOR in addition to the periodic assistance mentioned above.
4. Reports will be submitted by the independent firm on the OWNER’S Trimble Unity Construct, indicating observations and results of tests and indicating compliance or noncompliance with the requirements of the Contract Documents.

1.4 COMMISSIONING MANUAL

A. The CONSTRUCTOR shall assemble copies of all test results, commissioning forms completed by the CONSTRUCTOR, reports, sign off sheets, start-up documentation, training data and any other information related to starting equipment into a 3 ring binder with sections tabbed for each system or piece of equipment.

B. Copies of manual to be submitted as part of project closeout. 01 70 00. An electronic copy shall be posted on the OWNER’S Trimble Unity Construct.

PART 2 PRODUCTS

 Not Used.

PART 3 EXECUTION

 Not Used.

END OF SECTION

**EQUIPMENT MAINTENANCE FORM**

* Model #
* Serial #
* Filter Size & Quantity
* Filter Manufacturer & Model #
* Filter Merv Rating
* Manufacturer
* Belt Quantity & Size
* Location
* Pump Coupling MFG & Model #
* Grease able or Sealed Bearings
* Motor Info from Nameplate- Supply and Return
* Voltage
* Vendor
* Warranty Info
* Disconnect Location
* Bearing Make & Model #
* Coil Info- Make & Model
* Pulley & Sheave Info
* Balancing Reports
* Glycol %

# 01 81 00 GENERAL COMMISSIONING REQUIREMENTS 01 81 00

1. GENERAL

1.1 INTRODUCTION

* + - * 1. This Section 01 81 00 "General Commissioning Requirements" shall form the basis of the construction phase commissioning plan and shall be supplemented and enhanced by the Commissioning Authority (CxA) throughout the construction process. The CxA shall add, modify, and refine the commissioning procedures, as approved by the OWNER, to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks. The contractor is required to input equipment data on the Cx software.
			1. PROJECT SPECIFICATIONS
				1. Various sections of the project specifications require equipment start-up, testing, and adjusting services. Requirements for start-up, testing, and adjusting services specified in the Division 23 and 26 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The CONSTRUCTOR shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
				2. Additional commissioning related requirements are addressed in sections 01 70 00 and 01 75 00. These sections address the required start-up and closeout procedures, including O&M manuals, systems manuals, and other additional maintenance information required by the OWNER. The CONSTRUCTOR is required to provide information for the systems manuals within the timelines in section 01 70 00 and 01 75 00. The CONSTRUCTOR is required to provided extended training, including participating in systems training classes.
				3. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications, shall be attached to the related sections of the completed project commissioning plan, and indexed for future reference.
				4. Where University of Northern Iowa training or educational services are required and specified in the Division 23 and Division 26 series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.
			2. COMMISSIONING DESCRIPTION
				1. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the operational needs. The commissioning process shall encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction phase is intended to achieve the following specific objectives according to the contract documents:

Verify that the applicable equipment and systems are installed in accordance with the design intent as expressed through the contact documents and according to the manufacturer's recommendations.

Verify and document proper integrated performance of equipment and systems.

Verify that O&M documentation is complete.

Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.

Verify that the facilities operating personnel are adequately trained.

Document the successful achievement of the commissioning objectives listed above.

* + - * 1. The commissioning process does not take away from or reduce the responsibility of the system designers or installing CONSTRUCTORs to provide a finished and fully functioning product.
			1. SUMMARY
				1. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.
				2. Refer to the Commissioning Plan for more specific information regarding process and procedures. The Commissioning Plan also provides specific information on the roles and responsibilities for all Commissioning Team members.

A preliminary Cx plan will be placed on the UNI Trimble Unity Construct along with the rest of the contract documents. The preliminary plan will be further developed during the construction process.

* + - * 1. CXAlloy will be used to track all of the commissioning progress. Constructors shall enter equipment information, fill out checklists and answer construction issues throughout the project.
				2. Related Sections include the following:

Division 23 Section "Commissioning of Mechanical Systems" for specific requirements for commissioning HVAC & plumbing systems.

Division 26 Section “Commissioning of Electrical Systems” for specific requirement for commissioning electrical systems.

* + - 1. DEFINITIONS
				1. BoD: Basis of Design - a dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to the OWNER. It is initially the outcome of the programming and conceptual design phases.
				2. Commissioning – Commissioning is a comprehensive and systematic process to verify that the building systems perform as designed to meet the OWNER’S requirements. Commissioning during the construction, acceptance, and warranty phases is intended to achieve the following specific objectives:

Verify and document that equipment is installed and started per manufacturer’s recommendations, industry accepted minimum standards, and the Contract Documents.

Verify and document that equipment and systems receive complete operational checkout by installing CONSTRUCTORS.

Verify and document equipment and system performance.

Verify the completeness of operations and maintenance materials.

Ensure that the OWNER’S operating personnel are adequately trained on the operation and maintenance of building equipment.

The commissioning process does not take away from or reduce the responsibility of the DESIGN PROFESSIONAL or installing CONSTRUCTOR to provide a finished and fully functioning product.

* + - * 1. Commissioning Plan – a dynamic document that describes how the commissioning process will be applied to this project. It is an overall plan that provides the structure, schedule and coordination for the commissioning process.
				2. CxA: Commissioning Authority – the designated person, company, or entity responsible for the commissioning process. The CxA is the OWNER’S own certified staff.
				3. Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents, does not perform properly or is not complying with the design intent.
				4. Functional Performance Test (FPT) - test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system’s sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB’s primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The Commissioning Agent develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing CONSTRUCTOR or vendor. Functional Performance Tests are performed after System Readiness Checklists (SRC) and startups are complete.
				5. OPR: OWNER’S Project Requirements – A dynamic document outlining the OWNER’S requirements relative to Mechanical, Electrical, Plumbing and Electronic Safety and Security Systems prepared by the CxA in consultation with the OWNER.
				6. System Readiness Checklist (SRC) - a list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the Commissioning Agent to the CONSTRUCTOR. System Readiness Checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some System Readiness Checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The term “System Readiness” refers to before functional testing. System Readiness Checklists augment and are combined with the manufacturer’s start-up checklist and the CONSTRUCTOR’S Quality Control checklists.
				7. Seasonal Performance Tests - Functional Performance Test that are deferred until the system(s) will experience conditions closer to their design conditions.
				8. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
				9. TAB: Testing, Adjusting, and Balancing.
				10. Warranty Period - warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.
			1. SYSTEMS TO BE COMMISSIONED (Edit As Required)
				1. The following systems will be commissioned as part of this project:

Mechanical (Division 23)

Air Handling Unit with or without integrated heat pump

Fan Coil Units

Air Terminal VAV Units

Energy Recovery Ventilators with or without integrated heat pumps

Split Systems

Pumps

Cabinet Unit Heaters

Radiant Floor Slabs

Water-to-water Heat Pumps

Water-to-air Heat Pumps

Chilled Water System

Plate and Frame Heat Exchangers

Steam to Hot Water Heat Exchangers

Steam Pressure Reducing Valves

Condensate Pumps

Hot Water Generators

Mixing Valves

Automatic Plumbing Fixtures

Sump Pumps

VFDs

Electrical (Division 26)

Lighting Controls

Occupancy Sensors

Emergency Generator Systems

Electronic Access Systems. Both hardware and software.

DDC Building Automation Systems

Elevator

Fire Alarm Systems

3. Testing

 All systems shall be tested on their own and in combination with full building systems.

4. Building Envelope

 (DESIGN PROFESSIONAL to insert specific tests)

* + - 1. COMMISSIONING TEAM
				1. Members Appointed by CONSTRUCTOR(S):

Commissioning Manager: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.

Commissioning Representatives: Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of CONSTRUCTOR, including Project superintendent and subconsultants, electrical, mechanical and controls installers, suppliers, and specialists deemed appropriate by the OWNER and CxA.

* + - * 1. Members Appointed by OWNER:

CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. OWNER will engage the CxA under a separate contract.

Representatives of the facility user and operation and maintenance personnel.

DESIGN PROFESSIONALS.

* + - 1. OWNER'S RESPONSIBILITIES
				1. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:

Coordination meetings.

Training in operation and maintenance of systems, subsystems, and equipment.

Testing meetings.

Witness and assist in systems functional testing.

Demonstration of operation of systems, subsystems, and equipment.

* + - * 1. Provide utility services required for the commissioning process.
				2. Provide the BoD documents, prepared by DESIGN PROFESSIONAL and approved by OWNER, to the CxA and for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.
			1. CONSTRUCTOR’S RESPONSIBILITIES
				1. Provide utility services required for the commissioning process.
				2. The CONSTRUCTOR shall assign a Commissioning Manager to manage commissioning activities of the CONSTRUCTOR, subconsultants, installers and vendors.
				3. Each installing CONSTRUCTOR shall assign representatives with expertise and authority to act on behalf of the CONSTRUCTOR and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:

Participate in construction-phase coordination meetings.

Participate in maintenance orientation and inspection.

Participate in operation and maintenance training sessions.

Participate in final review at acceptance meeting.

Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.

Enter equipment information, fill out checklists, and answer construction issues in the CxAlloy program.

Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

Review and approve final commissioning documentation.

* + - * 1. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:

Participate in construction-phase coordination meetings.

Participate in maintenance orientation and inspection.

Participate in procedures meeting for testing.

Participate in final review at acceptance meeting.

Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.

Provide information to the CxA for developing construction-phase commissioning plan.

Enter equipment information, fill out checklists, and answer construction issues in the CxAlloy program.

Participate in training sessions for OWNER’S operation and maintenance personnel.

Provide updated Project Record Documents to the CxA on a regular basis.

Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in section 01 70 00.

Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

* + - * 1. Contructor shall input equipment data into Cx software.
			1. CxA'S RESPONSIBILITIES
				1. Organize and lead the commissioning team.
				2. Prepare a construction-phase commissioning plan. Collaborate with the CONSTRUCTOR and with subcontractors to develop test and inspection procedures. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.
				3. Review and comment on selected submittals from each CONSTRUCTOR for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.
				4. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
				5. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.
				6. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BoD, and Contract Documents. Inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
				7. Prepare Project-specific test and inspection procedures and checklists.
				8. Schedule, direct, witness, and document tests, inspections, and systems startup.
				9. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
				10. Verify date of acceptance and startup for each item of equipment for start of warranty periods. Warranty must extend 1 year from Substantial Completion regardless of start up time. CONSTRUCTOR to purchase extended warranties if required.
				11. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the Contract Documents. Operation and maintenance documentation requirements are specified in Division 01 Section 01 70 00 “Closeout Procedures.”
				12. Coordinate closeout scheduling, furniture move in and building flush out. Review detailed schedule with the CONSTRUCTOR and all applicable subcontractors and others involved in the commissioning process.
				13. Review operation and maintenance training program developed by the CONSTRUCTOR. Verify training plans provide qualified instructors to conduct operation and maintenance training. Operation and maintenance training is specified in Division 01 Section 01 70 00 "Closeout Procedures."
				14. Prepare commissioning reports.
				15. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems. Meet with O&M staff and others to review specific issues that came up during operations.
				16. Assemble the final commissioning documentation, including the Final Commissioning Report and Addenda to the Final Commissioning Report and post into Trimble Unity Construct.
			2. COMMISSIONING DOCUMENTATION
				1. OPR: A written document, prepared by the CxA in conjunction with the OWNER that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
				2. BoD Document: A document, prepared by the DESIGN PROFESSIONAL, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
				3. Commissioning Plan: A document, prepared by CxA, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:

Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.

Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.

Identification of systems and equipment to be commissioned.

Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.

Description of responsibilities of commissioning team members.

Description of requirements for operation and maintenance training, including required training materials.

Description of expected performance for systems, subsystems, equipment, and controls.

Duration schedule for commissioning activities.

Identification of installed systems, subsystems, and equipment.

Process for documenting changes on a continuous basis to appear in Project Record Documents.

Process for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.

Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.

* + - * 1. Functional Test Procedures: CxA shall develop Functional Test Procedures for each system to be commissioned, including subsystems, or equipment and interfaces or interlocks with other systems. Functional Test Procedures will include a separate entry, with space for comments, for each item to be tested. Preliminary Functional Test Procedures will be provided to the OWNER, DESIGN PROFESSIONAL, CONSTRUCTOR for review and comment. Include test procedures for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:

Name and identification code of tested item.

Test number.

Time and date of test.

Indication of whether the record is for a first test or retest following correction of a problem or issue.

Dated signatures of the person performing test and of the witness, if applicable.

Individuals present for test.

Deficiencies.

Issue number, if any, generated as the result of test.

* + - * 1. System Readiness Checklists: The CxA shall prepare Systems Readiness Checklists that describe the minimum conditions necessary prior to testing. System Readiness Checklists shall be signed by the CONSTRUCTOR, Subcontractor(s), and Installer(s), certifying that systems, subsystems, equipment, and associated controls are ready for testing. Completed test checklists signed by the responsible parties shall accompany this certificate. The CxA will spot check System Readiness Checklists to verify accuracy and readiness for testing. Inaccurate System Readiness Checklists shall be returned to the CONSTRUCTOR for correction and resubmission.
				2. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any.
				3. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

Creating an Issues Log Entry:

Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.

Assign a descriptive title of the issue.

Identify date and time of the issue.

Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.

Identify system, subsystem, and equipment to which the issue applies.

Include information that may be helpful in diagnosing or evaluating the issue.

Note recommended corrective action.

Identify commissioning team member responsible for corrective action.

Identify person documenting the issue.

Documenting Issue Resolution:

Log date correction is completed or the issue is resolved.

Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.

Identify changes to the OPR, BoD, or Contract Documents that may require action.

State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.

Identify person(s) who corrected or resolved the issue.

Identify person(s) documenting the issue resolution.

* + - * 1. Final Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:

Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during OWNER occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.

OPR and BoD documentation.

Commissioning plan.

Testing plans and reports.

Commissioning Issues log.

Completed System Rediness Checklists.

Completed Functional Test Procedures.

Listing of off-season test(s) not performed and a schedule for their completion.

* + - * 1. Addendum to Final Commissioning Report: CxA shall prepare an Addendum to the Final Commissioning Report near the end of the Warranty Period. The Addendum shall indicate whether systems, subsystems, and equipment are complete and continue to perform according to the OPR, BoD, and Contract Documents. The Addendum to the Final Commissioning Report shall include, but is not limited to, the following:

Documentation of off-season test(s) results.

Completed Functional Test Procedures for off-season test(s).

Updated status of unresolved issues.

Documentation that unresolved system performance issues have been resolved.

Updated Commissioning Issues Log.

Listing of potential Warranty Claims to be corrected by the CONSTRUCTOR.

* + - * 1. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:

OPR and BoD, including system narratives, schematics, and changes made throughout the Project.

Project Record Documents as specified in Division 01 Section "Project Record Documents."

Final commissioning plan.

Commissioning report.

Operation and maintenance data as specified in Division 01 Section 01 70 00 "Operation and Maintenance Data."

“Equipment Information Summary” detailing all pertinent equipment information for all installed systems. See Section 01 70 00 “Operations and Maintenance data for additional information.

All additional information outlined in Division 01 Section 01 70 00 “Preparation of Systems Manual”.

* + - 1. SUBMITTALS
				1. Preliminary Construction Commissioning Plan Submittal: CxA shall submit on Trimble Unity Construct one electronic copy of Preliminary Construction Commissioning Plan. Present submittal in sufficient detail to evaluate data collection and arrangement process. Review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan. All submittals shall be on Trimble Unity Construct.
				2. Construction Commissioning Plan Final Submittal: CxA shall submit electronically formatted information of final commissioning plan on Trimble Unity Construct. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.
				3. Functional Test Procedures and Report Forms: CxA shall submit preliminary functional test procedures on Trimble Unity Construct and forms to CONSTRUCTOR, OWNER and DESIGN PROFESSIONAL for review and comment. The CONSTRUCTOR and subcontractors shall return review comments to the CxA. The OWNER and DESIGN PROFESSIONAL shall also return review comments to the CxA. CxA shall incorporate review comments into the Final Functional Test Procedures to be used in system testing and publish to Trimble Unity Construct.
				4. System Readiness Checklists: CxA shall submit System Readiness Checklists to be completed by the CONSTRUCTOR and posted to Trimble Unity Construct.
				5. Test and Inspection Reports: CxA shall post test and inspection reports to Trimble Unity Construct.
				6. Corrective Action Documents: CxA shall post Commissioning Issues Log to Trimble Unity Construct.
				7. Preliminary Commissioning Report Submittal: CxA shall submit an electronic version of the preliminary commissioning report. Review comments, will be returned to the CxA for preparation of final submittal.
				8. Final Commissioning Report Submittal: CxA shall post an electronically formatted information of the final commissioning report on Trimble Unity Construct. The final submittal must address previous review comments and shall include a copy of the preliminary commissioning report review comments along with a response to each item.
				9. Equipment Submittals: The CONSTRUCTOR shall submit copies of approved submittals for equipment to be commissioned on Trimble Unity Construct. The CxA shall review and evaluate submittals applicable to systems being commissioned for compliance with commissioning needs, and the OPR.
				10. Data for Commissioning:

The Commissioning Authority shall request in writing from the CONSTRUCTOR specific information needed about each piece of commissioned equipment or system to fulfill requirements of the Commissioning Plan.

Typically this information shall include manufacturer and model number, detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any required testing, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the OWNER to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.

The Commissioning Authority may request further documentation as is necessary for the commissioning process. Much of this information will also be included with the O&M manual submittals normally submitted in the project.

* + - 1. COMMISSIONING PROCESS
				1. The CxA shall be responsible for the overall management of the commissioning process as well as the specific scheduling of all procedures.
				2. Prior to the start of mechanical or electrical system installation, the CONSTRUCTOR shall designate a specific individual as the Commissioning Manager (CM) to manage and lead the commissioning effort on behalf of the CONSTRUCTOR. The CM shall provide a single point of contact and communications for all commissioning related services.
				3. Prior to the start of mechanical or electrical system installation, the CONSTRUCTOR shall designate specific individuals as commissioning representatives (CR) for each Subcontractor to be associated with commissioning work. The commissioning representatives shall participate in the commissioning process as team members providing commissioning testing services, equipment operation, adjustments, and corrections if necessary. All CR's shall be selected as individuals having sufficient authority to direct their respective staff to provide the services required, accept and provide minor changes to the work on behalf of the subcontractors or various organizations involved, and to speak on behalf of their organizations in all commissioning related contractual matters
			2. QUALITY ASSURANCE
				1. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
				2. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within twelve months prior to use.
			3. COORDINATION
				1. Management: The CxA shall direct and coordinate the commissioning activities and the commissioning reports to the OWNER. All members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
				2. Scheduling: The CxA shall work with the CONSTRUCTOR and the OWNER to schedule the commissioning activities. The CxA shall provide sufficient notice to the CONSTRUCTOR and the OWNER for scheduling commissioning activities. The CONSTRUCTOR shall integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
				3. Initial Schedule of Commissioning Events: The CxA shall provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The Commissioning Plan shall provide a format for this schedule. As construction progresses more detailed schedules shall be developed by the CxA. The Commissioning Plan shall provide a format for detailed schedules.
				4. Coordinating Meetings: CxA shall conduct monthly coordination meetings in conjunction with regular progress meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
				5. Pretesting Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.
				6. Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

Schedule times for tests, inspections, obtaining samples, and similar activities.

1. PRODUCTS
	* + 1. TEST EQUIPMENT
				1. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the CONSTRUCTOR for the equipment being tested.
				2. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be turned over to the CPM after testing has been completed, except for stand-alone data-logging equipment that may be provided or used by the CONSTRUCTOR.
				3. Data logging equipment and software required to test equipment shall be provided by the CONSTRUCTOR for use during testing.
				4. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 C and a resolution of + or - 0.1 C. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.
2. EXECUTION
	* + 1. START-UP, SYSTEM READINESS CHECKLISTS AND INITIAL CHECKOUT
				1. The following procedures shall apply to all equipment and systems to be commissioned, according to Section 1, Systems To Be Commissioned.

System Readiness Checklists are important to ensure that the equipment and systems are hooked up and operational. These ensure that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment shall receive a full System Readiness Checklist checkout. No sampling strategies are used. The System Readiness Checklist for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

The CxA shall develop System Readiness Checklists and procedures with the assistance of the CONSTRUCTOR. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.

The CONSTRUCTOR shall determine which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.

Sensor and Actuator Calibration

All field-installed temperature, relative humidity, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described in Division 23 specifications.

All procedures used shall be fully documented on the System Readiness Checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

Execution of System Readiness Checklists and Startup

Four weeks prior to startup, the CONSTRUCTOR shall schedule startup and checkout with the OWNER and CXA. The performance of the System Readiness Checklists, startup and checkout shall be directed and executed by the CONSTRUCTOR.

The CxA shall observe the procedures for each piece of primary equipment.

The CONSTRUCTOR shall execute startup and provide the CxA with a signed and dated copy of the completed start-up and System Readiness Checklists and initial tests, at least one (1) week before the scheduled start of functional performance testing for the respective system. CxA shall witness startup activities.

Only individuals that have direct knowledge and witnessed that a line item task on the System Readiness Checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

* + - 1. PHASED COMMISSIONING
				1. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the CxA, OWNER, and the CONSTRUCTOR. Results will be added to the master and commissioning schedule.
			2. FUNCTIONAL PERFORMANCE TESTING
				1. This sub-section applies to commissioning functional testing of equipment and systems for all divisions.
				2. Objectives and Scope: The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems. In general, each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, fire alarm and emergency power) where there is a specified system response. The CONSTRUCTOR shall verify each sequence in the sequences of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.
				3. Development of Test Procedures: Before test procedures are written, the CONSTRUCTOR shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements found in the specification sections of commissioned equipment and systems the CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. The CONSTRUCTOR shall assist the CxA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the CONSTRUCTOR who shall review the tests for feasibility, safety, equipment and warranty protection.
				4. Purpose of Test Procedures: The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form. The test procedure forms developed by the CxA shall include, but not be limited to the following information:

System and equipment or component name(s).

Equipment location and ID number.

Unique test ID number, and reference to unique System Readiness Checklists and start-up documentation ID numbers for the piece of equipment.

Date.

Project name.

Participating parties.

Required pre-test field measurements.

Instructions for setting up the test.

Special cautions, alarm limits, etc.

Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format.

Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.

A section for comments.

Signatures and date block for the CxA, CONSTRUCTOR, Sub-CONSTRUCTORs, and OWNER.

* + - * 1. HVAC System Trend Logs: Submit HVAC system Trend Logs to the Commissioning Professional prior to the commencement of HVAC system functional performance testing. Trend logs shall be submitted thereafter upon request of the OWNER or Commissioning Professional until Final Completion of each system.
				2. Test Methods: Functional performance testing and verification shall be achieved by manual testing (persons manipulate the equipment and observe performance) and/or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CONSTRUCTOR and CxA shall determine which method is most appropriate for tests that do not have a method specified.

Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.

Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.

Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 12 oC, when the outside air temperature is above 12 oC, temporarily change the lockout setpoint to be 2 oC above the current outside air temperature.

Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification shall be completed during system readiness testing.

Setup: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The CONSTRUCTOR shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the CONSTRUCTOR shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.

Sampling: No sampling is allowed in completing System Readiness Checklists. Sampling is allowed for functional test procedures execution. The CxA shall determine the sampling rate. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the CONSTRUCTOR to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units. Costs associated with testing expanded samples and/or all equipment or systems of the specified type are the responsibility of the CONSTRUCTOR.

Coordination and Scheduling: The CONSTRUCTOR shall provide sufficient notice to the CxA and OWNER regarding the completion schedule for the System Readiness Checklists and startup of all equipment and systems. The CxA shall schedule functional tests through the CONSTRUCTOR and OWNER. The CxA shall direct, witness and document the functional testing of equipment and systems. The CONSTRUCTOR shall execute the tests.

Testing Pre-Requisites: In general, functional testing shall be conducted after system readiness testing and startup has been satisfactorily completed. The control system shall be sufficiently tested and approved by the CxA and the OWNER before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing shall be completed and debugged before functional testing of air-related or water-related equipment or systems. Testing shall proceed from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems shall be checked.

* + - * 1. Problem Solving: The CxA shall recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the CONSTRUCTOR.
			1. DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS
				1. Documentation: The CxA shall witness and document the results of all functional performance tests using the Commissioning Issues Log.
				2. Non-Conformance: The CxA shall record the results of the functional test on the Commissioning Issues Log. All deficiencies or non-conformance issues shall be noted and reported to the OWNER on the Commissioning Issues Log.

Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution shall be documented on the Commissioning Issues Log.

Every effort shall be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so by direction from the OWNER.

As tests progress and a deficiency is identified, the CxA shall discuss the issue with the CONSTRUCTOR.

When there is no dispute on the deficiency and the CONSTRUCTOR accepts responsibility to correct it:

The CxA shall document the deficiency and the CONSTRUCTOR’S response and intentions and they go on to another test or sequence. After the day's work, the CxA shall submit the Commissioning Issues Log to the OWNER and CONSTRUCTOR. The CONSTRUCTOR shall correct the deficiency, and update the Commissioning Issues Log with corrective action taken, and date resolved.

If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

The deficiency shall be documented on the Commissioning Issues Log with the CONSTRUCTOR’S response and a copy given to the OWNER, DESIGN PROFESSIONAL and to the CONSTRUCTOR.

Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the OWNER.

The CxA shall document the resolution process.

Once the interpretation and resolution have been decided, the CONSTRUCTOR shall correct the deficiency, and update the Commissioning Issues Log and provide it to the CxA.

* + - * 1. Cost of Retesting: The cost to retest a functional test because of failure, shall be solely the responsibility of the CONSTRUCTOR. Any required retesting by the CONSTRUCTOR shall not be considered a justified reason for a claim of additional cost, delay or for a time extension by the CONSTRUCTOR.
				2. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the OWNER. In such case, the CONSTRUCTOR shall provide with the following:

Within one week of notification from the OWNER, the CONSTRUCTOR or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the OWNER within two weeks of the original notice.

Within two weeks of the original notification, the CONSTRUCTOR or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

The OWNER shall determine whether a replacement of all identical units or a repair is acceptable.

Two examples of the proposed solution shall be installed by the CONSTRUCTOR and the CPM shall be allowed to test the installations for up to one week, upon which the CPM will decide whether to accept the solution.

Upon acceptance, the CONSTRUCTOR and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

* + - * 1. Approval: The CxA shall note each satisfactorily demonstrated function on the test form. Formal approval of the functional test shall be made later after review by the CxA and by the OWNER. The CxA shall evaluate each test and report to the OWNER using a standard form. The OWNER shall give final approval on each test using the same form, and provide signed copies to the CxA and the CONSTRUCTOR. Additional costs for retesting due to defective equipment shall be paid by the CONSTRUCTOR.
			1. DEFERRED TESTING
				1. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the OWNER. These tests shall be conducted in the same manner as the seasonal tests as soon as possible.
				2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) specified in Division 23 sections of the specifications shall be completed as part of this contract. The CxA shall coordinate this activity. Tests shall be executed, documented and deficiencies corrected by the CONSTRUCTOR, with facilities staff and the CxA witnessing. Any final adjustments to the functional testing data due to the testing shall be made.
			2. OPERATION AND MAINTENANCE TRAINING REQUIREMENTS
				1. Training Preparation: Before operation and maintenance training, CxA shall convene a Commissioning meeting to include OWNER’S operation and maintenance personnel, CONSTRUCTOR, and subCONSTRUCTORs. In addition to requirements specified in Section 01 70 00 “Closeout” perform the following:

Review the OPR and BoD.

Review installed systems, subsystems, and equipment.

Review instructor qualifications.

Review instructional methods and procedures.

Review training module outlines and contents, which shall be submittted to CxA no later than four (4) weeks after acceptance of the associated equipment submittals.

Review course materials (including operation and maintenance manuals).

Inspect and discuss locations and other facilities required for instruction.

Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.

For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

* + - * 1. Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Section 01 70 00 “Closeout."
				2. Develop with O&M staff a list of training scenarios that represent potential real time system failures to determine how they interact and procedures to follow.
			1. OPERATION AND MAINTENANCE MANUALS
				1. Submission of Operations and Maintenance Data: Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

Package Quality: Documents must be fully legible. Poor quality copies and material with hole-punches obliterating the text or drawings will not be accepted. Documents shall be written in English language.

Package Content: Data package content shall be as shown in the paragraph titled "Schedule of Operation and Maintenance Data Packages." Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.

Changes to Submittals: Manufacturer-originated changes or revisions to submitted data shall be furnished by the CONSTRUCTOR if a component of an item is so affected subsequent to acceptance of the O&M Data. Changes, additions, or revisions required by the OWNER for final acceptance of submitted data, shall be submitted by the CONSTRUCTOR within 30 calendar days of the notification of this change requirement.

Commissioning Record and Testing Data: Provide a separate manual dedicated to documenting the commissioning process which shall include all certifications and testing data and some repeating of O&M data.

* + - * 1. Types of information required in O&M data packages: provide the following information in O&M manual packages:

Operating Instructions: Include specific instructions, procedures, and illustrations for the following phases of operation:

Safety Precautions: List personnel hazards and equipment or product safety precautions for all operating conditions.

Operator Prestart: Include procedures required to set up and prepare each system for use.

Startup, Shutdown, and Post-Shutdown Procedures: Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

Normal Operations: Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

Emergency Operations: Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

Operator Service Requirements: Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

Environmental Conditions: Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

Preventive Maintenance: Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

Lubrication Data: Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":

A table showing recommended lubricants for specific temperature ranges and applications.

Charts with a schematic diagram of the equipment showing
lubrication points, recommended types and grades of lubricants, and capacities.

A Lubrication Schedule showing service interval frequency.

Preventive Maintenance Plan and Schedule: Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

Corrective Maintenance (Repair: Include manufacturer's recommended procedures and instructions for correcting problems and making repairs.

Troubleshooting Guides and Diagnostic Techniques: Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or requires replacement.

Wiring Diagrams and Control Diagrams: Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

Maintenance and Repair Procedures: Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

Removal and Replacement Instructions: Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. Include a list of spare parts and supplies that have a long lead-time to obtain.

Corrective Maintenance Work-Hours: Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog

Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components such as the compressor of air conditioning system.

Personnel Training Requirements: Provide information available from the manufacturer that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

Testing Equipment and Special Tool Information: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

CONSTRUCTOR Information: Provide a list that includes the name, address, and telephone number of the CONSTRUCTOR and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

Appendices: Provide information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment.

* + - * 1. Schedule of Operations and Maintenance Manual Packages: Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

First Submission: The first submission of O&M Manuals shall be made within 4 weeks after approval of equipment submittals. This submission shall include the Table of Contents, divider tabs, and approved submittal data arranged in accordance with the requirements provided in paragraph C above.

Second Submission: The second submission shall be made at least 6 weeks prior to scheduled functional performance testing and/or scheduled CONSTRUCTOR’s training, whichever is earlier. The second submission shall include all required Operations & Maintenance data as described in the specifications.

* + - * 1. CxA Review and Approval: Prior to substantial completion, the CxA shall review the O&M manual data, documentation and redlined as-builds for equipment and systems that were commissioned to verify compliance with the O&M documentation requirements of the specifications. The CxA shall communicate deficiencies in the manuals to the OWNER. Upon a successful review of the corrections, the CxA shall recommend approval and acceptance of these sections of the O&M manuals to the OWNER. The CxA shall also review each equipment warranty and verify that all requirements to keep the warranty valid are clearly stated. This work does not supersede the normal review requirement of the O&M manual data as indicated elsewhere in the specifications.

END OF SECTION