Addendum #1

Please note the following clarifications and additions are hereby made to the aforementioned RFCSP.

**UPDATE/CHANGE**

Changing the due date for Proposals from February 9, 2021 to **February 16, 2021** at 2:00pm
Changing the due date for HUB Sub Contracting Plans from Feb 10, 2021 to **Feb 17, 2021** at 2:00pm
Changing the Public opening date from February 12, 2021 to **February 19, 2021** at 2:00pm

Teams Meeting information:  Via Teams meeting – Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
+1 940-304-2772,776258730#  United States, Denton
Phone Conference ID: 776 258 730#
Find a local number | Reset PIN

**ATTACHMENTS:**

Answers to Question including DIVISION 1 documents
Clarifications to Specifications
Clarifications to Drawings

---

Denise Harpool

Issued by
2/2/2021
Date

ACKNOWLEDGEMENT: Please acknowledge receipt of this addendum by initialing the appropriate line on the Addenda Checklist, Section 4 of the RFCSP.
ADDENDUM NO. 001

PROJECT: UNT – Chemistry Third Floor Welch Chair Lab Renovation
ST0569.2001.00

DATE: February 2, 2021

DISTRIBUTION: Owner

For corrections or clarifications, contact: Jeffrey Davis

This Addendum becomes part of the Contract Documents and shall be acknowledged by each bidder on the proposal form. All parts of the original specifications and drawings shall remain in force except as noted below:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DETAIL</th>
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</thead>
<tbody>
<tr>
<td>Q: Would UNT consider Accutrol (<a href="https://www.accutrolllc.com/as">https://www.accutrolllc.com/as</a>) as a manufacturer for the Laboratory precision air valves and controls system? A: Substitution Request Denied – Project includes Phoenix Controls as Base Bid and CRC as Alternate #1 (UNT)</td>
<td></td>
</tr>
<tr>
<td>Q: Verification Electricians will be running all necessary conduit/raceways. A: Electrical Contractor will be responsible for all conduits and raceways.</td>
<td></td>
</tr>
<tr>
<td>Q: Will there be any work needed for a security system? A: No security system work.</td>
<td></td>
</tr>
<tr>
<td>Q: If work will be needed for a security system, can prints be provided? A: No security system work.</td>
<td></td>
</tr>
<tr>
<td>Q: Requirements for wire i.e. 22-2, 22-4, Cat5, Cat6, Plenum, non-plenum? A: All cabling will be provided by Owner.</td>
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</tr>
<tr>
<td>Q: Will any equipment be needed in the Telecom Room? A: All work to be performed by Owner, except for conduits and boxes indicated on the electrical Drawings.</td>
<td></td>
</tr>
<tr>
<td>Q: Substitution Request Lab Controls – TSI Products? A: Substitution Request Denied – Project includes Phoenix Controls as Base Bid and CRC as Alternate #1 (UNT)</td>
<td></td>
</tr>
<tr>
<td>Q: How much notice is required for work to be performed in lab on level 2? A: Five (5) business days noticed has been requested by the users.</td>
<td></td>
</tr>
<tr>
<td>Q: Who is the controls provider for this building HVAC system? A: Schneider Electric, Contact: Jess Davis - (214) 679-1918</td>
<td></td>
</tr>
<tr>
<td>Q: Sheet AD101, Detail A1 references demo note #2 on the floor plan, but there is no description for this note provided. Please confirm that demo note #2 references removing the door, frame and hardware. A: Demolition Note “2” refers to removal of door and frame, sheet reissued in this addendum.</td>
<td></td>
</tr>
<tr>
<td>Q: Is preferred access to the building through the Northeast stairwell (North of room 392)? Can we use the adjacent elevator? A: Yes. Elevator interior will need to be protected.</td>
<td></td>
</tr>
<tr>
<td>Q: Will this work be done in normal working hours only? Or will after-hours work be required? A: Demolition and tie-in work affecting adjacent spaces and building system shutdown will need to be done after hours/weekends.</td>
<td></td>
</tr>
<tr>
<td>Q: Are dumpsters allowed to be located in the parking lot directly north of the building? A: Refer to Site Logistics Map on G001, sheet reissued in this addendum.</td>
<td></td>
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<tr>
<td>ITEM</td>
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</tbody>
</table>
| 1.14 | Q: Please confirm that abatement is not part of contractor’s scope of work.  
A: Confirmed, no abatement |
| 1.15 | Q: Sheet AD101 indicates there is a temporary partition along the corridor. Is the intent to have a temporary partition for the duration of the project? And are there specs for what material should be used for the temporary partition?  
A: The partition shall remain for duration of project. Refer to Section 01 5000 for partition construction specifications. |
| 1.16 | Q: Spec 09 65 13 does not provide approved manufacturers for RBB-1 rubber base. Please provide.  
A: Refer to Addendum Narrative, manufacturer added. |
| 1.17 | Q: Spec 10 26 00 does not provide approved manufacturers for CG1 and CG2 corner guards. Please provide.  
A: Refer to Addendum Narrative, manufacturer added |
| 1.18 | Q: Is the existing fire alarm system Notifier?  
A: Yes, the existing system is Notifier. |
| 1.19 | Q: Sheet A101 references PPE Hooks in room #333, #331, #335. However there appears to be no product information in the contract documents indicating what basis of design should be used. Please provide.  
A: Refer to Plan Notes for Basis of Design, sheet A101 reissued in this addendum. |
| 1.20 | Q: Sheet A101, Room Finish Schedule indicates floor finish to be "Conc 1". Is "Conc 1" referencing spec 09 91 23 section 3.5C regarding floor sealer Tnemec Everthane Series 247 finish? If not please clarify what "Conc 1" is.  
A: Conc-1 refers to Polished Concrete, refer to attached Section 03 3543. 09 9123 3.5.C has been removed from the specification. |
| 1.21 | Q: Spec section 11 5313 section 2.1B indicates that fume hoods are to be obtained by same source as laboratory casework. Is it acceptable to use different suppliers for fume hood and casework?  
A: No, Fume Hoods and Casework should be obtained from the same supplier. |
| 1.22 | Q: Please provide the class schedule for spaces directly below the new lab suite for access.  
A: The areas below 331/334 are a computer lab and chemistry research lab. These labs are utilized throughout any day and even after hours. I will coordinate access to these area with the appropriate PI with a 2-3 week heads up from the contractor. |
| 1.23 | Q: Sheet A801, detail A5 shows fume hood F-330.1 and a casework cabinet directly below the fume hood. Please provide the cabinet type below the fume hood. Additionally, please confirm if another cabinet is required under the fume hood. There is currently one shown.  
A: Base cabinet is Flammable Cabinet SBC24. Refer to attached A801 reissued in this addendum. |
| 1.24 | Q: Sheet A800, Laboratory equipment schedule indicates that the equipment is owner furnished. Are the items listed in the equipment schedule to be contractor installed? Or are these owner installed?  
A: Equipment Schedule is for reference only, all items are Owner Furnished, Owner Installed. |
| 1.25 | Q: On sheet A101, Detail A1 shows the new drywall partitions to be installed and areas of existing to remain. During the site walk on 01/21/21, it was noticed that all the existing walls have been stripped of the interior facing drywall and insulation. Please confirm that new insulation, drywall, paint and floor base is to be provided on the existing walls  
A: Yes. New insulation and finishes, refer to sheet A101 reissued in this addendum |
| 1.26 | Q: Sheet A101, detail A1, shows there is new drywall along the corridor outside the laboratory rooms. However, the room finish schedule provided on the same sheet does not include finish information for floor, base, and paint for the new walls on along the corridor. Please provide.  
A: New partitions along the corridor shall be patched and finished to match adjacent corridor finishes. |
| 1.27 | Q: Sheet A101 indicate alternate #1 to include phoenix valves in base bid and CRC valves in the alternate. However, on page 2 of spec 004100 (proposal form) the alternates bid section indicates "No alternates at this... 


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<tr>
<td>time”. Please clarify if the alternate for CRC Valves is to be provided. A: Refer to attached Section 01 2300 Alternates for alternate description.</td>
<td></td>
</tr>
<tr>
<td>1.28</td>
<td>Q: Due to the new layout of the dry-wall partitions along the corridor, please verify the new floor finish out side of doors 330.1, 331, and 335 is to be Tnemec Everthane Series 247, Clear Gloss as referenced in spec 09 9123 section 3.5C. A: Paragraph 09 9123 3.5.C has been removed. Floor in corridor shall be polished to match adjacent. Refer to Section 33 543 included in this addendum.</td>
</tr>
<tr>
<td>1.29</td>
<td>Q: A101 note M, please provide locations for smoke and fire dampers. Mechanical drawings do not indicate if the exhaust and supply ductwork penetrating through fire rated walls are to receive dampers. A: Fire damper/Fire smoke damper not required in lab exhaust or supply duct. Sheet M-201 shows single FD in transfer duct.</td>
</tr>
<tr>
<td>1.30</td>
<td>Q: Spec 23 31 13, section 1.6c, call for CAD shop drawings for ductwork. Are Cad shop drawings required? A: Yes. Shop drawings are required.</td>
</tr>
<tr>
<td>1.31</td>
<td>Q: Sheet M-701, detail 1, note 2 calls for a manual on/off switch for air flow through exhaust/canopy hood valve. Are these required? If so, are they located at each fume hood? A: Required only for the canopy hood.</td>
</tr>
<tr>
<td>1.32</td>
<td>Q: Sheet E-203 Key noted 1 indicates casework to receive receptacles and wires by casework manufacturer. However, this does not appear to be indicated in the casework specification 12 35 53 or architectural drawings. Is it acceptable for the receptacles and wiring to be done by the electrical sub onsite in lieu of the manufacturer? A: Refer to Section 12 3553, 2.11.F - Raceway and devices are to be integral with shelf supports and provided by the casework manufacturer. Final connections by the electrical contractor. [Text as needed]</td>
</tr>
<tr>
<td>1.33</td>
<td>Q: Sheet A101 indicates that Fire Extinguisher Cabinets are to be placed on non-fire rated walls, however spec 10 44 13 section 2.2 part B states that the cabinets are to be 1-hour fire rated, please confirm that these cabinets are to be non-rated. A: Cabinets in non-rated partitions are not required to be rated.</td>
</tr>
<tr>
<td>1.34</td>
<td>Q: What are the heights for CG1 and CG2 corner guards? A: Corner guards will extend from 6” AFF to 7’-0” AFF</td>
</tr>
<tr>
<td>1.35</td>
<td>Q: Are there any fire suppression systems that will need to be monitored? A: Yes the existing fire suppression system will be monitored.</td>
</tr>
<tr>
<td>1.36</td>
<td>Q: Sheet E-203 shows Fire Alarm A/V’s. The old lab had manual pulls at the 2 exits. Will they be required to be replaced since the old manual pulls were removed? A: Yes, provide new pull stations at exits.</td>
</tr>
<tr>
<td>1.37</td>
<td>Q: In Division 11 5313 – Fume Hoods, Under 2.1 C it states “Other manufacturers' fume hoods of similar sizes, types, and configurations, and complying with the Specifications, may be considered. See Section 01 6000 &quot;Product Requirements.&quot; It also states the same in Division 12 – Wood Casework. We would like to propose a different manufacturer than those listed but I cannot find the “Section 01 6000 in the documents. Can you please direct me to that or send me a form so I can submit it? A: Substitution Request Denied – Bid as Specified</td>
</tr>
<tr>
<td>1.38</td>
<td>Q: What is UNT’s procedure for cutting into and tig welding to the existing SS exhaust duct in the Lab? Will this have to be done after hours? A: The contractor will coordinate a couple days ahead with UNT’s Risk Management team to secure a Hot Work Permit for the days welding and cutting will occur. The contractor will have to have a fire extinguisher at the area and perform fire watch. Utilization of a smoke-eater system will be required.</td>
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</tbody>
</table>
| 1.39 | Q: What is inside of exhaust duct that may be hazardous or flammable?  
A: The exhaust duct serves adjacent labs and is likely to have typical acid and solvent vapors. Workers conducting demolition and welding operations should have full face respirators. |
| 1.40 | Q: In section 23-3113-6-2.7C it is calling for butt weld joints but on drawing M-902 detail-5 it shows an EZ joint connection. Can we use Viron’s Quick Clamp System on exhaust 14” and under?  
A: Butt weld all SS lab exhaust joints and fittings as noted in specifications. EZ joint connector used only at lab valve connection. Viron quick clamp denied. |
| 1.41 | Q: What controls contractor does UNT prefer or do they contract the controls?  
A: Schneider Electric, Contact: Jess Davis - (214) 679-191 |
| 1.42 | Q: What test & balance contractor does UNT prefer or do they contract the test & balance?  
A: Contractor to provide MECH TAB; UNT will provide CX of ELEC & MECH. |
| 1.43 | Q: How much of this work will have to be done after hours?  
A: Work affecting adjacent occupied spaces, including plumbing demo/tie-in and building system shutdown. |
| 1.44 | Q: Is there a freight elevator to bring up material?  
A: Service elevator located at NE corner of building is available for use. Elevator cab will need to be protected. |
| 1.45 | Q: Does UNT have a badging cost?  
A: No UNT badging required. UNT will issue construction core keys. |
| 1.46 | Q: Where will the mechanical contractor’s employees be allowed to park?  
A: Contractors are required to purchase parking permit to park on campus. Otherwise, lot 35 is available at no cost but will need a parking pass. |
| 1.47 | Q: Can we cap the existing SS exhaust taps or does the entire tap need to be removed back to the main?  
A: Remove existing tap(s) back to main. Provide new tap(s) at locations shown on drawings. |

**DRAWINGS (REISSUED SHEETS WITH MODIFICATIONS)**

<table>
<thead>
<tr>
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</thead>
</table>
| 1.48 | Sheet G001  
Added Site Logistics Map |
| 1.49 | Sheet AD101  
Removed area of ceiling noted to be demolished.  
Added keynote to identify removal of door and frame. |
| 1.50 | Sheet A101  
Added General Notes to “Floor Plan Notes”  
Added notes pertaining to firestopping penetration at existing perimeter wall.  
Added note to room finish schedule defining “CONC-1”  
Added note to match adjacent floor finish at door alcoves.  
Added dimensions locating lab casework. |
| 1.51 | Sheet A801  
Added casework type notes |
| 1.52 | Sheet E-103  
Added alternate manufacturer to fixture schedule. |
| 1.53 | Sheet E-203  
Mounting Height of certain receptacles and data outlets are added.  
Two data outlets in lab 334 at column 11 are deleted.  
Fire alarm pull stations added. |
<table>
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</table>
| 1.54 | Sheet P-301  
Added note to rework existing floor drains to be flush with new finished floor surface.  
Added rework of existing sanitary vents as found in the field. |
| 1.55 | Sheet PD-301  
Added rework of existing sanitary vents as found in the field. |

**PROJECT MANUAL/SPECIFICATIONS (NEW SPECIFICATION SECTIONS)**

<table>
<thead>
<tr>
<th>ITEM</th>
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</table>
| 1.56 | Section 01 1000 – Summary  
Add new section in its entirety. |
| 1.57 | Section 01 2300 – Alternates  
Add new section in its entirety. |
| 1.58 | Section 01 2500 – Substitution Procedures  
Add new section in its entirety. |
| 1.59 | Section 01 2600 – Contract Modification Procedure  
Add new section in its entirety. |
| 1.60 | Section 01 2900 – Payment Procedures  
Add new section in its entirety. |
| 1.61 | Section 01 3100 – Project Management Coordination  
Add new section in its entirety. |
| 1.62 | Section 01 3200 – Progress Documentation  
Add new section in its entirety. |
| 1.63 | Section 01 3233 – Photographic Documentation  
Add new section in its entirety. |
| 1.64 | Section 01 3300 – Submittal Procedures  
Add new section in its entirety. |
| 1.65 | Section 01 3516 – Alteration Project Procedures  
Add new section in its entirety. |
| 1.66 | Section 01 4000 – Quality Requirements  
Add new section in its entirety. |
| 1.67 | Section 01 4100 – Regulatory Requirements  
Add new section in its entirety. |
| 1.68 | Section 01 4200 – References  
Add new section in its entirety. |
| 1.69 | Section 01 5000 – Temporary Facilities and Controls  
Add new section in its entirety. |
| 1.70 | Section 01 5300 – Mold Prevention Procedures  
Add new section in its entirety. |
| 1.71 | Section 01 5720 – Indoor Air Quality During Construction  
Add new section in its entirety. |
| 1.72 | Section 01 6000 – Product Requirements  
Add new section in its entirety. |
<table>
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<tr>
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<tbody>
<tr>
<td>1.73</td>
<td>Section 01 7300 – Execution Add new section in its entirety.</td>
</tr>
<tr>
<td>1.74</td>
<td>Section 01 7823 – Operation and Maintenance Data Add new section in its entirety.</td>
</tr>
<tr>
<td>1.75</td>
<td>Section 01 7839 – Project Record Documents Add new section in its entirety.</td>
</tr>
<tr>
<td>1.76</td>
<td>Section 01 7900 – Demonstration and Training Add new section in its entirety.</td>
</tr>
<tr>
<td>1.77</td>
<td>Section 01 9113 – General commissioning Requirements Add new section in its entirety.</td>
</tr>
<tr>
<td>1.78</td>
<td>Section 03 3543 – Polished Concrete Finishing Add new section in its entirety.</td>
</tr>
</tbody>
</table>

**PROJECT MANUAL/SPECIFICATIONS (REISSUED SPECIFICATION SECTIONS WITH MODIFICATIONS)**

<table>
<thead>
<tr>
<th>ITEM</th>
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<tbody>
<tr>
<td>1.79</td>
<td>Section 08 7100 – Door hardware Replace section in its entirety with attached.</td>
</tr>
</tbody>
</table>

**PROJECT MANUAL/SPECIFICATIONS (CHANGES TO SPECIFICATION SECTIONS WITHOUT REISSUE)**

<table>
<thead>
<tr>
<th>ITEM</th>
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<tbody>
<tr>
<td>1.80</td>
<td>Refer to Section 09 6513 – RESILIENT BASE AND ACCESSORIES. Replace sub paragraph 2.1 with the following:</td>
</tr>
</tbody>
</table>

2.1 THERMOPLASTIC-RUBBER BASE - RB

A. **Basis-of-Design Product:** Subject to compliance with requirements, provide Johnsonite a comparable product by one of the following:

1. Armstrong

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

2. **Style and Location:**
   a. Style C, Butt to Thermoplastic-rubber base is generally 0.125 inch (3.2 mm) thick; however, sculptured base thicknesses might vary.

C. Thickness: 0.125 inch.
D. Height: 4 inches.
E. Lengths: Coils in manufacturer's standard length.
F. Outside Corners: Job formed.
G. Inside Corners: Job formed.
H. Colors: To match existing.
<table>
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<tr>
<td>1.81</td>
<td>Refer to Section 10 2600 – WALL AND DOOR PROTECTION. Refer to Paragraph 2.1 MANUFACTURERS, add the following subparagraph 2.1B</td>
</tr>
<tr>
<td></td>
<td><strong>B. Basis-of-Design Product:</strong> Subject to compliance with requirements, provide CS Group or a comparable product by one of the following:</td>
</tr>
<tr>
<td></td>
<td>1. InPro</td>
</tr>
<tr>
<td>1.82</td>
<td>Refer to Section 09 9123 – INTERIOR PAINTING. Refer to Paragraph 3.5 INTERIOR PAINTING SCHEDULE, Delete subparagraph 3.5.C in its entirety.</td>
</tr>
</tbody>
</table>

END OF ADDENDUM
UNIVERSITY OF NORTH TEXAS
CHEMISTRY – WELCH CHAIR
LAB RENOVATION
ISSUED FOR CONSTRUCTION – ADDENDUM 001
FEBRUARY 1, 2021

SECTION 01 1000
SUMMARY OF WORK

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes:
   1. Project information
   2. Work covered by Contract Documents
   3. Phased construction
   4. Work by Owner
   5. Owner-furnished products
   6. Access to site
   7. Coordination with occupants
   8. Work restrictions
   9. Specification and drawing conventions
   10. Special provisions
   11. Purpose of Division 1 – General Requirements

1.3 PROJECT INFORMATION
A. Owner: University of North Texas System
B. Project Identification: University of North Texas – Chemistry Welch Chair Lab Renovation
C. Project Location: Chemistry Building – 1508 W Mulberry St, Denton TX, 76201
   1. Owner’s Designated Representative: Thanh Kim Nguyen, Manager of Campus Planning,
      University of North Texas, 1155 Union Circle #311040, Denton, TX 76203-5017, P 940.565-3870
D. Architect: TreanorHL
E. Project Web Site: A Project Web site administered by the Contractor will be used for purposes
   of managing communication and documents during the construction stage.
   1. See Division 01 Section 013100 "Project Management and Coordination" for Contractor's
      requirements for utilizing the Project Web site.

1.4 WORK COVERED BY CONTRACT DOCUMENTS
A. The Work of the Project is defined by the Contract Documents and consists of the following:
   1. Laboratory renovation of approximately 2,625 SF, including new finishes, casework and
      chemical fume hoods to support synthetic chemistry research. Renovations will include
      modifications to the existing mechanical, plumbing and electrical systems to support the
      new laboratory.
B. Type of Contract
   1. Project will be constructed under a Competitive Sealed Proposal contract.

1.5 WORK BY OWNER
A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering
   with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with
   work performed by Owner.
B. Fees Paid by Owner: Impact Fees.
C. Fees Reimbursed by Owner: Tap Fees and Meter Fees.

1.6 ACCESS TO SITE
A. Use of Site: Limit use of Project site to [work in areas] [areas within the Contract limits] indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated. Use of any area outside of work area must be approved by Owner.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weather-tight condition throughout construction period. Repair damage caused by construction operations to equal or better condition.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.

2. Provide not less than Five (5) day's notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, except as otherwise indicated.

1. Hours for Utility Shutdowns: Coordinated with Owner, with not less than two (2) weeks written notice of intended shutdown.

2. Hours for core drilling and other noisy activities: Outside of business hours

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than three (3) days in advance of proposed utility interruptions.

2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than three (3) days in advance of proposed disruptive operations.

2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Nonsmoking Campus: Smoking is not permitted anywhere on any UNT campus.

F. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.10 SPECIAL PROVISIONS
   Review Owner’s Campus Design Guidelines (Denton ONLY) available at https://facilities.unt.edu/sites/default/files/DESIGN%20GUIDELINES%202017_rev%203_09.01.17.pdf

1.11 DIVISION 1 – GENERAL REQUIREMENTS
A. The specification sections contained with Division 01 – General Requirements, serve to expand and define in more detail, the administrative and procedural requirements outlined in Section 007000 – General Conditions. Should any provisions with Division 01 sections be in conflict with the General Conditions, the General Conditions shall govern.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)  END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for alternates.

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES
   A. Alternate No. 1: Laboratory Control System.
      1. Base Bid: Provide Phoenix Controls System as specified in Section 23 0913 - Laboratory
         Controls System.
      2. Alternate: Provide Critical Room Controls (CRC) as specified in Section 23 0913 -
         Laboratory Controls System.

END OF SECTION
SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS
A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS
A. Substitution Requests: Submit one (1) PDF file of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use CSI Form 012500.13
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product, fabrication, or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data: including drawings and descriptions of products and fabrication and installation procedures
      e. Samples, where applicable or requested
      f. Certificates and qualification data, where applicable or requested
      g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
      j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's
letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Design Professional will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.


b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE
A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES
A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS
A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Substitution request is fully documented and properly submitted.

c. Requested substitution will not adversely affect Contractor's construction schedule.

d. Requested substitution has received necessary approvals of authorities having jurisdiction.

e. Requested substitution is compatible with other portions of the Work.

f. Requested substitution has been coordinated with other portions of the Work.

g. Requested substitution provides specified warranty.

h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed, unless otherwise indicated. If allowed Design Professional will consider requests for substitution if received within sixty (60) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Design Professional.
1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect Design Professional redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   b. Requested substitution does not require extensive revisions to the Contract Documents.
   c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   d. Substitution request is fully documented and properly submitted.
   e. Requested substitution will not adversely affect Contractor's construction schedule.
   f. Requested substitution has received necessary approvals of authorities having jurisdiction.
   g. Requested substitution is compatible with other portions of the Work.
   h. Requested substitution has been coordinated with other portions of the Work.
   i. Requested substitution provides specified warranty.
   j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION
PROJECT: _______________________________ (After Contract Award)

TO: ___________________________________
______________________________________

NO. __________ DATE: ________________

Contractor hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section 012500 “Substitution Procedures”:

1. SPECIFIED PRODUCT OR SYSTEM

   Substitution request for: ___________________________________________________

   Specification Section No.: ___________________________Article/ Paragraph: _________________

2. REASON FOR SUBSTITUTION REQUEST

   SPECIFIED PRODUCT                                PROPOSED PRODUCT
   □ Is no longer available                            □ Will reduce construction time
   □ Is unable to meet project schedule                 □ Will result in cost savings of
   □ Is unsuitable for the designated application       $ _________________ to Project
   □ Cannot interface with adjacent materials         □ Is for supplier’s convenience
   □ Is not compatible with adjacent materials         □ Is for subcontractor’s convenience
   □ Cannot provide the specified warranty             □ Other: __________________________
   □ Cannot be constructed as indicated                _____________________________
   □ Cannot be obtained due to one or more of the following:
     □ Strike                                         □ Bankruptcy of manufacturer or supplier
     □ Lockout                                        □ Similar occurrence (explain below)

3. SUPPORTING DATA

   □ Drawings, specifications, product data, performance data, test data, and any other necessary information to facilitate review of the Substitution Request are attached.

   □ Sample is attached                                □ Sample will be sent if requested

4. QUALITY COMPARISON

   Provide all necessary side-by-side comparative data as required to facilitate review of Substitution Request:

   SPECIFIED PRODUCT                                PROPOSED PRODUCT
Manufacturer: ____________________________________________
Name / Brand: ____________________________________________
Catalog No.: ____________________________________________
Vendor: ____________________________________________
Variations: ____________________________________________

(Add Additional Sheets If Necessary)

Local Distributor or Supplier: ____________________________________________
Maintenance Service Available: ☐ Yes ☐ No
Spare Parts Source: ____________________________________________
Warranty: ☐ Yes ☐ No _____ Years

5. PREVIOUS INSTALLATIONS

Identification of at least three (3) similar projects on which proposed substitution was used:

PROJECT #1
Project: ____________________________________________
Address: ____________________________________________
_____________________________________________________
Architect: ____________________________________________
Owner: ____________________________________________
Contractor: ____________________________________________
Date Installed: ____________________________________________

PROJECT #2
Project: ____________________________________________
Address: ____________________________________________
_____________________________________________________
Architect: ____________________________________________
Owner: ____________________________________________
Contractor: ____________________________________________
Date Installed: ____________________________________________

PROJECT #3
Project: ____________________________________________________________

Address: ____________________________________________________________

Architect: __________________________________________________________

Owner: _____________________________________________________________

Contractor: _________________________________________________________

Date Installed: _______________________________________________________

6. EFFECT OF SUBSTITUTION

Proposed substitution affects other work or trades:  □ No  □ Yes (if yes, explain)

_______________________________________________________________________

_______________________________________________________________________

Proposed substitution requires dimensional revisions or redesign of architectural, structural, M-E-P, life safety, or other work:

□ No  □ Yes (if yes, attach data explaining revisions)

7. STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS

Contractor and Subcontractor have investigated the proposed substitution and hereby represent that:

A. They have personally investigated the proposed substitution and believe that it is equal to or superior in all respects to specified product, except as stated above;

B. The proposed substitution is in compliance with applicable codes and ordinances;

C. The proposed substitution will provide same warranty as specified for specified product;

D. They will coordinate the incorporation of the proposed substitution into the Work, and will include modifications to the Work as required to fully integrate the substitution;

E. They have included complete cost data and implications of the substitution (attached);

F. They will pay any redesign fees incurred by the Architect or any of the Design Professional’s consultants, and any special inspection costs incurred by the Owner, caused by the use of this product;

G. They waive all future claims for added cost or time to the Contract related to the substitution, or that become known after substitution is accepted.

H. The Design Professional’s approval, if granted, will be based upon reliance upon data submitted and the opinion, knowledge, information, and belief of the Design Professional at the time decision is rendered and Addendum is issued; and that Design Professional’s approval therefore is interim in nature and subject to reevaluation and reconsideration as additional data, materials, workmanship, and coordination with other work are observed and reviewed.

Contractor: __________________________________________________________

(Name of Contractor)

Date: ___________________  By: ________________________________
Subcontractor: ________________________________________________
(Name of Subcontractor)

Date: ___________________ By: __________________________

Note: Unresponsive or incomplete requests will be rejected and returned without review.

8. DESIGN PROFESSIONAL’S REVIEW AND ACTION

☐ Substitution is accepted.

☐ Substitution is accepted, with the following comments: ____________________________
                                                                                      ____________________________
                                                                              ____________________________
                                                                              ____________________________

☐ Resubmit Substitution Request:

☐ Provide more information in the following areas: ____________________________
                                                                                      ____________________________
                                                                              ____________________________
                                                                              ____________________________

☐ Provide proposal indicating amount of savings / credit to Owner

☐ Bidding Contractor shall sign Bidder's Statement of Conformance

☐ Bidding Subcontractor shall sign Bidder's Statement of Conformance

☐ Substitution is not accepted:

☐ Substitution Request received too late.

☐ Substitution Request received directly from subcontractor or supplier.

☐ Substitution Request not submitted in accordance with requirements.

☐ Substitution Request Form is not properly executed.

☐ Substitution Request does not indicate what item is being proposed.

☐ Insufficient information submitted to facilitate proper evaluation.

☐ Proposed product does not appear to comply with specified requirements.

☐ Proposed product will require substantial revisions to Contract Documents.

By: ____________________________

Date: ____________________________

Design Professional has relied upon the information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to be not in compliance with the Contract Documents, Contractor shall provide the specified product.
9. OWNER’S REVIEW AND ACTION

☐ Substitution is accepted for items not involving additional costs.

☐ Substitution is not accepted.

By: ________________________________

(Owner’s Construction Manager)

Date: ____________________________

END OF FORM
SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
B. Related Sections:
   1. Division 01 Section 01 6000, "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK
A. Design Professional will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions." or Architect's Bulletin form.

1.4 CHANGE ORDER REQUESTS
A. Owner/Design Professional-Initiated Change Order Requests: will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Change Order Requests issued by Owner/Design Professional are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Change Order Request after receipt of Change Order Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
      e. Quotation Form: Use Change Order Request (COR) form. Contractor shall complete the COR Cost Analysis form and the Sub-Contractor shall submit the Sub-Contractor Cost Analysis form with supporting documentation and cost breakdown by line item, or other form approved by Owner.
B. Contractor-Initiated Change Orders: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner/Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor’s construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 01 Section 01 2500, "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

7. Change Order Request Form: Use Owner’s standard Change Order Request form as approved by Owner and Design Professional.

1.5 ADMINISTRATIVE CHANGE ORDERS
   A. Allowance Adjustment: Refer to Division 01, Section 012100, "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
   B. Unit Price Adjustment: Refer to Division 01 Section 012200, "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES
   A. On Owner's approval of a Change Order Request, Owner will prepare and issue a Change Order on attached form for signatures of Owner, Design Professional and Contractor.

1.7 CONSTRUCTION CHANGE DIRECTIVE
      1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
   B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
      1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)
CONSTRUCTION CHANGE ORDER

□ Construction Agreement  □ JOC Job Order  JO Date:

FROM OWNER:
University of North Texas System
1155 Union Circle #311040
Denton, TX 76203

TO CONTRACTOR: (Name and Address)

CHANGE ORDER NO.:
DATE:
CIP PROJECT NO.:
PO NO.:
A/E NAME:
PROJECT/CONTRACT NO.:
CONTRACT DATE:
PROJECT NAME:

The Agreement is changed as follows:

The original Agreement, Early Release Packages, and/or GMP Amendment Sum:

The net change by previously authorized Change Orders:

The Agreement Sum prior to this Change Order:

The Agreement Sum will be increased by this Change Order in the amount of

New Agreement Sum including this Change Order:

The TIME of the project has increased by

The date of SUBSTANTIAL COMPLETION as of the date of this Change Order is

Or if services are being provided after SUBSTANTIAL COMPLETION

The completion date of the services provided in this Change Order will be

NOT VALID UNTIL SIGNED BY THE A/E, CONTRACTOR AND OWNER

A/E (Firm Name )

CONTRACTOR (Firm Name )

OWNER

By (Signature)

By (Signature)

By (Signature)

Name (Typed or Printed Name)

Name (Typed or Printed Name)

Name (Typed or Printed Name)

Title

Title

Title

Date

Date

Date

Approved by UNTS OGC through 12/31/2021
Construction Change Directive

FROM OWNER:
University of North Texas (System or Institution);
1155 Union Circle #311040
Denton, Texas 76203

TO CONTRACTOR: (Name and Address)

CONSTRUCTION CHANGE DIRECTIVE NUMBER:

DATE ISSUED: ____________________________

PROJECT NAME: __________________________

AGREEMENT DATE: __________________________

CIP PROJECT NUMBER

PURCHASE ORDER NUMBER: __________________________

The following change in the Contract Documents is approved by the Owner and the Work is authorized to proceed accordingly:

Additional Days Required __________________________ Calendar Days __________________________ Not to Exceed Cost $ __________________________

When the Owner and Contractor agree upon the exact adjustment in the Contract Price and/or the Contract Time for a change in the Work directed by this Construction Change Directive, such agreement shall be the subject of a Change Order.

The Change Order shall include all outstanding Construction Change Directives that the contractor would like to include on an application for payment.

A Change Order must be executed before the Contractor is allowed to add the Work described above on an application for payment.

Owner
University of North Texas (System or Institution Name)

BY (Signature) ____________________________
[Authorized Signatory Name]
[Authorized Signatory Title]

Date ___________________________

CONSTRUCTION CHANGE DIRECTIVE
UNT SYSTEM - OGC Approved 01/06/2020 - 01/31/2022
SECTION 01 2900

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 01 Specifications Sections apply to this Section.

1.2 SUMMARY
A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
B. Related Sections include the following:
   1. Division 01 Section 012600 for administrative procedures for handling changes to the Contract.
   2. Division 01 Section 013200 for administrative requirements governing preparation and submittal of Contractor’s Construction Schedule and Submittal Schedule.
   3. Division 00 Section 007000 – University of North Texas System Uniform General Conditions and Supplementary General Conditions 2019, Amended.

1.3 DEFINITIONS
A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor’s Application for Payment. The Schedule of Values is a form provided by Owner to Contractor

1.4 SCHEDULE OF VALUES
A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor’s Construction Schedule
   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules including the following:
      a. Application for Payment form with Continuation Sheets
      b. Submittal Schedule
      c. Contractor’s Construction Schedule
   2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven calendar days before the date scheduled for submittal of initial Application for Payment.
   3. Sub schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules indicating values correlated with each phase of payment.
B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
   a. Project name and location
   b. Name of Architect
   c. Architect’s project number
   d. Contractor’s name and address
   e. Date of submittal

2. The Schedule of Values is formatted using CSI Divisions. (see form instructions)

3. Draft Submittals: Submit in same format as final payment application

4. Arrange the Schedule of Values in tabular form with separate sections to indicate the following for each item listed:
   a. Related Specification Section or Division
   b. Change Orders (numbers) that affect value
   c. Dollar value
      1) Percentage of the Contract Sum to nearest one-tenth percent adjusted to total 100 percent.

5. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Owner/Architect will review Contractor’s Schedule of Values and approve upon receipt of sufficient detail as deemed satisfactory to Owner/Architect.

6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site.
      Include evidence of insurance and storage in bonded warehousing for materials stored off-site.
   b. For major items provide separate line items for materials and labor based on CSI Master Format Division. Major items include but not limited to:
      - Division 01 - General Requirements
      - Division 02 - Existing Conditions
      - Division 03 - Concrete
      - Division 04 - Masonry
      - Division 05 - Metals
      - Division 06 - Wood, Plastics, Composites
      - Division 07 - Thermal and Moisture Protection
      - Division 08 - Openings
      - Division 09 - Finishes
      - Division 10 - Specialties
      - Division 11 - Equipment
      - Division 12 - Furnishings
      - Division 13 - Special Construction
      - Division 14 - Conveying Equipment
      - Division 21 - Fire Suppression
      - Division 22 - Plumbing
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost.

8. In addition to line item costs of Sections in Division 02 thru 39, furnish line item costs for each item of the following general administrative and procedural cost items.
   a. Bonds
   b. Insurance
   c. Mobilization
   d. Field Superintendence
   e. Temporary Facilities
   f. Trench Safety
   g. Clean-up and Disposal
   h. Project Close Out
   i. Final Cleaning
   j. Demobilization
   k. Overhead and General Conditions
   l. Contractor’s Fee

9. Plumbing, HVAC, Electrical and Life Safety work shall be broken down in accordance with the following subcategories as a minimum:
   a. Fire Protection:
   b. Plumbing:
   c. Heating, Ventilating and Air Conditioning (HVAC):
   d. Electrical:
   e. Fire Detection and Alarm:
10. Schedule Updating: Update and resubmit the Schedule of Values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Electronically deliver in a format approved by Owner after the Design Professional has certified the Payment Application Payment processing will start as soon as we receive and date stamp the payment. In return the Contractor will be given a receipt that will be initialed and a photocopy will be provided to the Contractor.

B. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion and Final Application for Payment involve additional requirements.

C. Payment Application Times: Progress payment is due once a month.

D. Payment Application Forms: Use Application for Payment form to be furnished by Owner.

E. Application Preparation: Complete every entry on form. Application to be Notarized by a Notary and executed by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Order issued before the last day of construction period covered by application.

3. Include supporting documentation including subcontractor and supplier invoices.

F. Transmittal: Prepare one copy with original signatures and original notary of each Application for Payment by a method ensuring receipt within 24-hours. The copy shall include waivers of lien, schedule updates, contractor's executive summary and similar attachments.

1. Transmit each package with a transmittal form listing attachments and recording appropriate information about application including subcontractor supplemental documentation and required general conditions documents.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic’s lien from subcontractors, sub-subcontractors and suppliers for construction period covered by the previous application.

1. Submit partial lien waivers on each item for amount requested in previous applications after deduction for retainage of each item.

2. When an application shows completion of an item submit final or full lien waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit lien waivers.

4. Submit final Application for Payment with, or proceeded by, final lien waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.

5. Waiver Forms: Submit waivers of lien on forms executed in a manner acceptable to Owner.
H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment.
   1. Include the following:
      a. List of subcontractors
      b. Schedule of Values
      c. Contractor’s Construction Schedule (preliminary if not final)
      d. Products list
      e. Submittal Schedule (preliminary if not final)
      f. List of Contractor’s staff assignments
      g. List of Contractor’s principal consultants
      h. Initial progress report
      i. Report of preconstruction conference
      j. Certificates of insurance and insurance policies
      k. Performance and payment bonds
      l. Data needed to acquire Owner’s insurance

I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: Submit Final Application for Payment within thirty (30) days of Substantial Completion along with releases and supporting documentation not previously submitted and accepted including, but not limited to, the following:
   1. Evidence of completion of Project closeout requirements
   2. Insurance certificate for products and completed operations where required and proof taxes, fees and similar obligations were paid
   3. Updated final statement accounting for final changes to the Contract Sum
   4. AIA Document G706, “Contractor’s Affidavit of Payment of Debts and Claims”
   5. AIA Document G706A, “Contractor’s Affidavit of Release of Liens”
   6. AIA Document G707, “Consent of Surety to Final Payment”
   7. Evidence that claims have been settled

K. Electronic Fund Transfer (EFT): Vendors are encouraged to utilize EFT for the distribution of all future payments. To sign up for EFT, complete the EFT Agreement (Supplier) at, https://www.untsystem.edu/sites/default/files/forms/procurement/supplier_eft_form_revised.pdf. Once established, all future payments will be made by EFT. When an EFT payment is made, an email will be sent to the email address you specify on the EFT agreement form. If you have any questions, please contact the Business Service Center at bsc@untsystem.edu or 940-369-5500.

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION (Not Used)

END OF SECTION
SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures
   2. Administrative and supervisory personnel
   3. Coordination drawings
   4. Requests for Information (RFIs)
   5. Project Web site
   6. Project meetings
B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS
A. RFI: Request from Contractor seeking information from each other during construction.

1.4 COORDINATION
A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule, continually updated, and in a format acceptable to Owner
   2. Preparation of the schedule of values
   3. Installation and removal of temporary facilities and controls
   4. Delivery and processing of submittals
   5. Progress meetings
   6. Pre-Installation conferences
   7. Project closeout activities
   8. Startup and adjustment of systems
9. Project closeout activities

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
   b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
   c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
   e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
   f. Indicate required installation sequences.
   g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Design Professional indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

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

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines, including fire protection requirements.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
   a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems
   b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment
c. Fire-rated enclosures around ductwork

7. Electrical Work: Show the following:
   a. Runs of vertical and horizontal conduit 1¼-inch diameter and larger
   b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations
   c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor control center locations
   d. Location of pull boxes and junction boxes, dimensioned from column center lines

8. Fire Protection System: Show the following:
   a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If the Design Professional determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Design Professional will so inform the Contractor (copy the Owner), who shall make changes as directed and resubmit.

10. Coordination Drawing Prints: Prepare coordination drawing prints in accordance with requirements of Division 01 Section 013300, "Submittal Procedures".

C. Coordination Digital Data Files: Prepare coordination digital data files in accordance with the following requirements:
   1. File Preparation Format: Same digital data software program, version, and operating system as the original Drawings.
   2. File Preparation Format: DWG, Version, operating in Microsoft Windows operating system.
   3. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.

4. Design Professional will furnish Contractor one set of digital data files of the Drawings for use in preparing coordination digital data files. Refer to Division 01 Section 013300, "Submittal Procedures", for digital data file requirements.
   a. Design Professional makes no representations as to the accuracy or completeness of digital data files as they relate to the Drawings.
   b. Digital Data Software Program: The Drawings are available in Revit Version 2020
   c. Contractor shall execute a data licensing agreement in a form agreeable to the Design Professional.

1.6 CHANGE KEY PERSONNEL
A. Change Key Personnel Names: Changes to key personnel originally stated in the bid response must include a revised list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
   1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
   2. Key personnel must be same as those proposed in the bid response unless changes are authorized in writing from the Associate Vice Chancellor for System Facilities prior to their first day on the project.

1.7 REQUESTS FOR INFORMATION (RFIs)
A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI. All RFIs should be sent directly to the Design Professional via email or posted to project collaboration site (if one is being utilized).
The Design Professional will redistribute to the appropriate reviewer.
1. Design Professional will return RFIs submitted to Design Professional by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name
2. Project number
3. Date
4. Name of Contractor
5. Name of Design Professional
6. RFI number, numbered sequentially
7. RFI subject
8. RFI Question
9. Specification Section number and title and related paragraphs, as appropriate
10. Drawing number and detail references, as appropriate
11. Field dimensions and conditions, as appropriate
12. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
13. Contractor's signature
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
   a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Design Professional. RFIs should be emailed to Design Professional with the following format standards. 1) RFI should include RFI number in subject line of email along with brief description. 2) Body of email should include question or description of RFI and suggestion. Sketches or other necessary documents should be attached to email in PDF format.

D. Design Professional's Action: Design Professional will review each RFI, determine action required, and respond. Allow seven (7) business days for Design Professional's response for each RFI. RFIs received by Design Professional after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
   a. Requests for approval of submittals
   b. Requests for approval of substitutions
   c. Requests for coordination information already indicated in the Contract Documents
   d. Requests for adjustments in the Contract Time or the Contract Sum
   e. Requests for interpretation of Design Professional's actions on submittals
   f. Incomplete RFIs or inaccurately prepared RFIs
2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will date from time of receipt of additional information.
3. Design Professional's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section 012600, "Contract Modification Procedures".
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within ten (10) days of receipt of the RFI response.

E. On receipt of Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Design Professional within seven days...
if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Log with not less than the following:
1. RFI Log Date
2. Project name
3. Name and address of Contractor
4. Name and address of Design Professional and Construction Manager
5. RFI number including RFIs that were dropped and not submitted
6. RFI description
7. Date the RFI was submitted
8. Request Date
9. Date Design Professional's and Construction Manager's response was received
10. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate
11. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate

1.8 PROJECT MEETINGS
A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Design Professional of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees in advance of meeting.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Design Professional, within three (3) days of the meeting.

B. Pre-construction Conference: Schedule and conduct a pre-construction conference before starting construction, at a time convenient to Owner and Design Professional, but no later than fifteen (15) days after notice to proceed.
1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Distribute the agenda to all invited attendees in advance of meeting. Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule
   b. Phasing
   c. Critical work sequencing and long-lead items
   d. Designation of key personnel and their duties
   e. Lines of communications
   f. Procedures for processing field decisions and Change Orders
   g. Procedures for RFIs
   h. Procedures for testing and inspecting
   i. Procedures for processing Applications for Payment
   j. Distribution of the Contract Documents
   k. Submittal procedures
   l. Sustainable design requirements
   m. Preparation of record documents
   n. Use of the premises[and existing building]
o. Work restrictions
p. Working hours
q. Owner's occupancy requirements
r. Responsibility for temporary facilities and controls
s. Procedures for moisture and mold control
t. Procedures for disruptions and shutdowns
u. Construction waste management and recycling
v. Parking availability
w. Office, work, and storage areas
x. Equipment deliveries and priorities
y. First aid
z. Security
aa. Progress cleaning
bb. Commissioning requirements/coordination

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes within three (3) days of meeting date.

C. Pre-Installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Design Professional of scheduled meeting dates.

2. Agenda: Distribute the agenda to all invited attendees in advance of meeting. Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   a. Contract Documents
   b. Options
c. Related RFIs
d. Related Change Orders
e. Purchases
f. Deliveries
g. Submittals
h. Review of mockups
   i. Possible conflicts
   j. Compatibility problems
   k. Time schedules
   l. Weather limitations
   m. Manufacturer's written recommendations
   n. Warranty requirements
   o. Compatibility of materials
   p. Acceptability of substrates
   q. Temporary facilities and controls
   r. Space and access limitations
   s. Regulations of authorities having jurisdiction
t. Testing and inspecting requirements
   u. Installation procedures
   v. Coordination with other work
   w. Required performance results
   x. Protection of adjacent work
   y. Protection of construction and personnel

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting
minutes within three (3) days of meeting date.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct Project closeout conference, at a time convenient to Owner and Design Professional, but no later than 60 days prior to the scheduled date of Substantial Completion.

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

2. Attendees: Authorized representatives of Owner, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Distribute the agenda to all invited attendees in advance of meeting. Discuss items of significance that could affect or delay Project closeout, including the following:
   a. Preparation of record documents
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance
   c. Submittal of written warranties
   d. Requirements for preparing sustainable design documentation
   e. Requirements for preparing operations and maintenance data
   f. Requirements for demonstration and training
   g. Preparation of Contractor's punch list
   h. Procedures for processing Applications for Payment at Substantial Completion and for final payment
   i. Submittal procedures
   j. Coordination of separate contracts
   k. Owner's partial occupancy requirements
   l. Installation of Owner's furniture, fixtures, and equipment
   m. Responsibility for removing temporary facilities and controls

4. Minutes: Entity conducting meeting will record and distribute meeting minutes within three (3) days of meeting date.

E. Progress Meetings: Conduct progress meetings at agreed upon intervals.

1. Coordinate dates of meetings with preparation of payment requests.

2. Attendees: In addition to representatives of Owner, Owner's Commissioning authority, Construction Manager, and Design Professional, each contractor, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Distribute the agenda to all invited attendees in advance of meeting. Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.
   b. Review present and future needs of each entity present, including the following: Interface requirements
      Sequence of operations
Status of submittals
Deliveries
Off-site fabrication
Access
Site utilization
Temporary facilities and controls
Progress cleaning
Quality and work standards
Status of correction of deficient items
Field observations
Status of RFIs
Status of proposal requests
Pending changes
Status of Change Orders
Pending claims and disputes
Documentation of information for payment requests
Recommendations of construction feasibility
Safety precautions and programs

4. Minutes: Entity responsible for conducting the meeting will record and distribute the
   meeting minutes to each party present and to parties requiring information within three (3)
   days of meeting date.
   a. Schedule Updating: Revise Contractor's construction schedule after each progress
      meeting where revisions to the schedule have been made or recognized. Issue
      revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct project coordination meetings at regular intervals. Project
   coordination meetings are in addition to specific meetings held for other purposes, such as
   progress meetings and pre-installation conferences.
   1. Attendees: In addition to representatives of Owner and Design Professional, each
      contractor, subcontractor, supplier, and other entity concerned with current progress or
      involved in planning, coordination, or performance of future activities shall be represented
      at these meetings. All participants at the meetings shall be familiar with Project and
      authorized to conclude matters relating to the Work.
   2. Agenda: Review and correct or approve minutes of the previous coordination meeting.
      Review other items of significance that could affect progress. Include topics for discussion
      as appropriate to status of Project.
      a. Combined Contractor's Construction Schedule: Review progress since the last
         coordination meeting. Determine whether each contract is on time, ahead of
         schedule, or behind schedule, in relation to combined Contractor's construction
         schedule. Determine how construction behind schedule will be expedited; secure
         commitments from parties involved to do so. Discuss whether schedule revisions
         are required to ensure that current and subsequent activities will be completed within
         the Contract Time.
      b. Schedule Updating: Revise combined Contractor's construction schedule after each
         coordination meeting where revisions to the schedule have been made or
         recognized. Issue revised schedule concurrently with report of each meeting.
      c. Review present and future needs of each contractor present, including the following:
         Interface requirements
         Sequence of operations
         Status of submittals
         Deliveries
         Off-site fabrication
         Access
Site utilization
Temporary facilities and controls
Work hours
Hazards and risks
Progress cleaning
Quality and work standards
Change Orders

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting, within three (3) days of meeting date.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes within three (3) days of meeting date.

G. Meetings Requested by Owner: While not necessarily coinciding with dates of other meetings, Owner reserves the right to call and conduct meetings with project participants as the need arises.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for documenting the progress of
      construction during performance of the Work, including the following:
      1. Contractor's Work Progress Schedule
      2. Daily construction reports
      3. Material location reports
      4. Field condition reports
      5. Special reports

1.3 DEFINITIONS
   A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring,
      and/or controlling the construction project. Activities included in a construction schedule that
      consume time and resources.
      1. Critical Activity: An activity on the critical path that must start and finish on the planned
         early start and finish times.
      2. Predecessor Activity: An activity that precedes another activity in the network.
      3. Successor Activity: An activity that follows another activity in the network.
   B. Baseline Schedule: The initial time schedule prepared by Contractor for Owner's information and
      acceptance that conveys Contractor's and Subcontractors' activities (including coordination and
      review activities required in the Contract Documents to be performed by Design Professional and
      Owner), durations, and sequence of work related to the entire Project to the extent required by
      the Contract Documents. The schedule clearly demonstrates the Longest Path of activities,
      durations, and necessary predecessor conditions that drive the end date of the schedule. The
      Baseline Schedule shall not exceed the time limit current under the Contract Documents.
   C. Longest Path: The sequence of directly related activities that comprise the longest continuous
      chain of activities from the start of the first activity to the finish of the last activity. The activities
      represent critical path plus float plus historical weather days. Each activity in the Longest Path is
      critical and directly related in that it prevents its successor from being scheduled earlier than it is.
   D. Event: The starting or ending point of an activity.
   E. Work Progress Schedule: The continually updated time schedule prepared and monitored by the
      Contractor that coordinates and integrates activities of the Project, including Contractor's
      services, Design Professional's services, the work of other consultants, suppliers, and Owner's
      activities with the anticipated construction schedules for other contractors. The WPS accurately
      indicates all necessary and appropriate revisions including a longest path impact analysis, as
      required by the conditions of the Work and the Project while maintaining a concise comparison to
      the Baseline Schedule.
   F. Float: The period of time a task can be delayed without delaying Substantial Completion date.

1.4 INFORMATIONAL SUBMITTALS
   A. Format for Submittals: Submit required submittals in the following format:
      1. PDF electronic file.
   B. Contractor's Baseline Schedule: Initial Baseline Schedule due with Guaranteed Maximum Price
      in a Construction Manager-At-Risk and with the Proposal Response in a CSP, of size required to
display entire schedule for entire construction period. The Baseline Schedule shall become the comparison to the actual conditions throughout the Contract duration and become part of the Contractor’s Work Progress Schedule.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (baseline or updated) and date on label.

C. WPS Reports: Concurrent with WPS schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, and remaining duration in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity.
3. Earnings Report: Compilation of Contractor’s total earnings from commencement of the Work until most recent Application for Payment.

D. Material Location Reports: Submit at prior to application for payment
E. Field Condition Reports: Submit at time of discovery of differing conditions
F. Special Reports: Submit at time of unusual event

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in WPS scheduling and reporting, with capability of producing WPS reports and diagrams within twenty-four (24) hours of Design Professional’s request.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
B. Coordinate Contractor’s construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR’S WORK PROGRESS SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
1. Procurement Activities: Include procurement process activities for long lead items (as identified by Contractor) and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section 013300, “Submittal Procedures” in schedule. Coordinate submittal review times in Contractor’s construction schedule with submittal schedule.
3. Startup and Testing Time: Include not less than fifteen (15) days for startup and testing.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Design Professional’s administrative procedures necessary
for certification of Substantial Completion.

5. Punch List and Final Completion: Include not more than thirty (30) days for punch list and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
   1. Phasing: Arrange list of activities on schedule by phase.
   2. Work under More Than One Contract: Include a separate activity for each contract.
   3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
   4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section 011000, "Summary". Delivery dates indicated stipulate the earliest possible delivery date.
   5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section 011000, "Summary". Delivery dates indicated stipulate the earliest possible delivery date.

6. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing conditions
   b. Limitations of continued occupancies
   c. Uninterruptible services
   d. Partial occupancy before Substantial Completion
   e. Use of premises restrictions
   f. Lead time for future construction
   g. Seasonal variations
   h. Environmental control

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
   a. Subcontract awards
   b. Submittals
   c. Purchases
   d. Mockups
   e. Fabrication
   f. Sample testing
   g. Deliveries
   h. Installation
   i. Tests and inspections
   j. Adjusting
   k. Curing
   l. Startup and placement into final use and operation

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
   a. Structural completion
   b. Permanent space enclosure
   c. Completion of mechanical installation
   d. Completion of electrical installation
   e. Substantial Completion

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
   1. Refer to Division 01 Section 012900, "Payment Procedures" for cost reporting and payment procedures.
F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
   1. Unresolved issues
   2. Unanswered RFIs
   3. Rejected or unreturned submittals
   4. Notations on returned submittals

G. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required for compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules. Confirm acceptability of software with Owner. Contractor is responsible for all costs associated with licensing and training of the software.

I. Schedule shall be updated with the weekly OAC meeting and must include current details for all activities.

2.2 CONTRACTOR'S WORK PROGRESS SCHEDULE (WPS SCHEDULE)

A. General: Contractor shall submit for review and approval a Baseline Schedule that will indicate starting and completing dates of various aspects required to complete the work using the Longest Path. The Baseline Schedule shall become the comparison to the actual conditions throughout the contract and become a part of the Work Progress Schedule.

B. Contractor's Work Progress Schedule (WPS) shall coordinate and integrate the services and activities of Contractor, Design Professional and Owner, other consultants/suppliers, subcontractors and requirements of governmental entities. The WPS is due within twenty-one (21) days after the effective date of Notice to Proceed.

C. Contractor shall be responsible to:
   1. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel and Owner's Representative, in proper methods of providing data and using WPS information.
   2. Establish procedures for monitoring and updating WPS and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
   3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.

D. WPS Preparation: Prepare a list of all activities required to complete the Work.
   1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals
      b. Mobilization and demobilization
      c. Purchase of materials
      d. Delivery
      e. Fabrication
      f. Utility interruptions
      g. Installation
      h. Work by Owner that may affect or be affected by Contractor's activities
      i. Testing
      j. Punch list and final completion
      k. Activities occurring following final completion
   2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone...
3. Processing: Process data to produce output data on a computer drawn, time scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the WPS within the limitations of the Contract Time.

4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.

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

F. Initial Issue of Schedule: Prepare initial schedule from a sorted activity list indicating straight "early start ". Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or subcontractor and the Work or activity
   2. Description of activity
   3. Principal events of activity
   4. Immediate preceding and succeeding activities
   5. Activity duration in workdays

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
   1. Identification of activities that have changed
   2. Changes in activity durations in workdays
   3. Changes in the critical path
   4. Changes in total float time
   5. Changes in the Contract Time
   6. Show relationship between activities on initial and updated schedule.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report record the following information concerning events at Project site:
   1. List of subcontractors at Project site
   2. List of separate contractors at Project site
   3. Approximate count of personnel at Project site
   4. Equipment at Project site
   5. Material deliveries
   6. High and low temperatures and general weather conditions, including presence of rain or snow
   7. Accidents
   8. Meetings and significant decisions
   9. Unusual events (refer to special reports)
   10. Stoppages, delays, shortages, and losses
   11. Meter readings and similar recordings
   12. Emergency procedures
   13. Orders and requests of authorities having jurisdiction
   14. Change Orders received and implemented
   15. Construction Change Directives received and implemented
   16. Services connected and disconnected
   17. Equipment or system tests and startups
   18. Partial completions and occupancies
   19. Substantial Completions authorized

B. Material Location Reports: Monthly prepare and submit a comprehensive list of materials delivered to and stored at Project site. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents prepare and submit, to the Design Professional, a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Executive Summary Reports: Provided monthly with Payment Applications. Provides highlight details, schedule summary, and other information pertinent to Owner, including, but not limited to the following:
   1. Table of contents, simple project schedule clearly indicating benchmark dates, a narrative stating the current status of construction, a list of construction concerns, a look at what is coming up, potential change order log, and progress photo’s.

2.4 SPECIAL REPORTS
A. General: Submit special reports directly to Owner within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR’S WORK PROGRESS SCHEDULE
A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using WPS scheduling.
   1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in WPS scheduling and reporting techniques. Submit qualifications.
   2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor’s WPS Updating: Update and submit the WPS with the OAC meeting minutes to reflect actual construction progress and activities.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Design Professional, Owner, commissioning agent, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION
SECTION 01 3233

PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for the following:
      1. Pre-construction photographs
      2. Periodic construction photographs
      3. Final completion construction photographs
      4. Owner may elect to retain an independent firm to photographically document the progress
         of the work. Work of this firm shall not diminish or replace responsibilities of the Contractor
         for documentation required by this section. Contractor to cooperate fully with independent
         photographer.

1.3 UNIT PRICES
   A. Basis for Bids: Base number of construction photographs on average of twenty (20) photographs
      per week over the duration of Project.

1.4 INFORMATIONAL SUBMITTALS
   A. Digital Photographs: Submit image files within three days of taking photographs.
      1. Digital Camera: Minimum sensor resolution of 8 megapixels.
      2. Format: Minimum 1600 by 1200 pixels, 400 dpi minimum, in unaltered original files, with
         same aspect ratio as the sensor, un-cropped, date and time stamped, in folder named by
         date of photograph, accompanied by key plan file.
      3. Identification: Provide the following information with each image description in file
         metadata tag:
         a. Name of Project
         b. Name of Design Professional
         c. Name of Contractor
         d. Date photograph was taken
         e. Description of location, direction (by compass point), and elevation or story of
            construction

1.5 COORDINATION
   A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested,
      including access to Project site and use of temporary facilities.

1.6 USAGE RIGHTS
   A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction
      of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA
   A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor
      size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 400
3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image editing software.
   1. Date and Time: Include date and time in file name for each image.
   2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

C. Pre-construction Photographs: Before commencement of excavation, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
   1. Flag construction limits before taking construction photographs
   2. Take twenty (20) photographs to show existing conditions adjacent to property before starting the Work
   3. Take twenty (20) photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction
   4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take twenty (20) photographs monthly (unless otherwise directed), coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Time-lapse Sequence Construction Photographs: Take photographs as indicated, to show status of construction and progress since last photographs were taken.
   1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
   2. Vantage Points: Following suggestions by Architect and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
      a. Commencement of the Work, through completion of subgrade construction
      b. Above-grade structural framing
      c. Exterior building enclosure
      d. Interior Work, through date of Substantial Completion

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes requirements for the submittal schedule and administrative and procedural
      requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 DEFINITIONS
   A. Action Submittals: Written and graphic information and physical samples that require Design
      Professional's responsive action. Action submittals are those submittals indicated in individual
      Specification Sections as action submittals.
   B. Informational Submittals: Written and graphic information and physical samples that do not
      require Design Professional's responsive action. Submittals may be rejected for not complying
      with requirements. Informational submittals are those submittals indicated in individual
      Specification Sections as informational submittals.
   C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from
      another computer over a network and that serves as the basis for standard Internet protocols. An
      FTP site is a portion of a network located outside of network firewalls within which internal and
      external users are able to access files.
   D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used
      for representing documents in a device-independent and display resolution-independent fixed-
      layout document format.

1.4 ACTION SUBMITTALS
   A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates
      required by construction schedule. Include time required for review, ordering, manufacturing,
      fabrication, and delivery when establishing dates. Include additional time required for making
      corrections or modifications to submittals noted by the Design Professional and additional time
      for handling and reviewing submittals required by those corrections.
      1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and
         Contractor's construction schedule.
      2. Initial Submittal: Submit concurrently with start-up construction schedule. Include
         submittals required during the first sixty (60) days of construction. List those submittals
         required to maintain orderly progress of the Work and those required early because of long
         lead-time for manufacture or fabrication.
      3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's
         construction schedule.
         Submit revised submittal schedule to reflect changes in current status and timing for
         submittals.
      4. Format: Arrange the following information in a tabular format:
         a. Scheduled date for first submittal
         b. Specification Section number and title
         c. Submittal category: Action, informational
         d. Name of subcontractor
         e. Description of the Work covered
         f. Scheduled date for Design Professional's final release or approval
         g. Scheduled dates for purchasing
1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Design Professional's Digital Data Files: Design Professional will provide electronic copies of CAD Drawings for Contractor's use in preparing coordination submittals.
   1. Design Professional will furnish Contractor one (1) set of drawing files for use in preparing Shop Drawings and Project record drawings.
   2. Design Professional makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
   5. CAD files will be furnished for each appropriate discipline.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are approved by Design Professional.
   3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
   4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   5. Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Design Professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals. Submittals received after 1:00 pm will be considered to have been received the following day.
   1. Allow ten (10) business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional will advise Contractor when a submittal being processed must be delayed for coordination. Allow fifteen (15) business days for review time for large or complex submittals will require additional review time. The following are examples but not limited to such submittals, Millwork, Curtain Wall, Structural Steel, Doors, Frames, Hardware (total opening).
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow ten (10) business days for review of each resubmittal.
   4. Sequential Review: Where sequential review of submittals by Design Professional's consultants, Owner, or other parties is indicated, allow fifteen (15) business days for initial review of each submittal.

D. Identification and Information: Place a permanent label or title block on each copy submittal item for identification.
   1. On large format Shop Drawings, Contractor shall stamp each individual page as well as the reviewer's stamp.
   2. Indicate name of firm or entity that prepared each submittal on label or title block.
   3. Provide a space approximately 6-inches by 8-inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Professional.
   4. Include the following information for processing and recording action taken:
      a. Project name
b. Date

c. Name of Design Professional

d. Name of Contractor

e. Name of subcontractor

f. Name of supplier

g. Name of manufacturer

h. Submittal number or other unique identifier, including revision identifier

   1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

   i. Number and title of appropriate Specification Section

   j. Drawing number and detail references, as appropriate

   k. Location(s) where product is to be installed, as appropriate

   l. Other necessary identification

E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

   a. For typical projects that do not require separate submittals for different buildings or sub the submittal file name shall use Specification Section number followed by a dash and then a sequential number. Resubmittals shall include an numerical suffix after another dash. Include brief description of submittal after sequential number or resubmittal suffix. (e.g., 061000-001-0 Rough Carpentry).

   b. For complex projects that require project identifier for separate buildings within a project or require individual submittals to be submitted by multiple subcontractors, the submittal file name shall follow the following: Specification Section number followed by a decimal point and then a sequential number. Resubmittals shall include an alphabetic suffix after another decimal point. Project Identifier should follow in parentheses (e.g., 061000-001-0 (LNHS) Rough Carpentry).

3. Provide means for insertion to permanently record Contractor’s review and approval markings and action taken by Design Professional.

4. Include the following information on an inserted cover sheet:

   a. Project name

   b. Date

   c. Name and address of Design Professional

   d. Name of Contractor

   e. Name of firm or entity that prepared submittal

   f. Name of subcontractor

   g. Name of supplier

   h. Name of manufacturer

   i. Number and title of appropriate Specification Section

   j. Drawing number and detail references, as appropriate

   k. Location(s) where product is to be installed, as appropriate

   l. Related physical samples submitted directly

   m. Other necessary identification

5. Include the following information as keywords in the electronic file metadata:

   a. Project name

   b. Number and title of appropriate Specification Section

   c. Manufacturer name

   d. Product name

F. Options: Identify options requiring selection by the Design Professional.

G. Deviations: Identify deviations from the Contract Documents on submittals.
H. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Design Professional observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
   1. Submit one (1) copy of submittal to concurrent reviewer in addition to specified number of copies to Design Professional.

I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Design Professional will return submittals, without review, received from sources other than Contractor.
   1. Transmittal Form: Use standard contractor form as approved by Design Professional Owner.
   2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Include all submitted information from previous submittal in resubmittal, to form a comprehensive document for Design Professional's review.
   4. Resubmit submittals until they are marked with 'Reviewed', 'Furnish as Corrected' notation from Design Professional's action stamp, or with approval notation from alternate reviewer.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals that are marked with 'Reviewed', 'Furnish as Corrected' notation from Design Professional's action stamp, or with approval notation from alternate reviewer.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Email or upload electronic submittals as PDF electronic files directly to Design Professional’s Info Exchange Folder specifically established for Project.
   2. Action Submittals: For large format drawings and submittals (larger than 11x17), submit PDF file plus two (2) hard copies. For smaller format drawings and submittals (11x17 or less), provide only PDF file. Design Professional will return only the marked-up PDF.
   3. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Design Professional will not return copies.
   4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section 017700, "Closeout Procedures”.
   5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
      a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
      b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
6. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section 014000, “Quality Requirements”.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's catalog cuts
      b. Manufacturer's product specifications
      c. Standard color charts
      d. Statement of compliance with specified referenced standards
      e. Testing by recognized testing agency
      f. Application of testing agency labels and seals
      g. Notation of coordination requirements
      h. Availability and delivery time information
   4. For equipment, include the following in addition to the above, as applicable:
      a. Wiring diagrams showing factory-installed wiring
      b. Printed performance curves
      c. Operational range diagrams
      d. Clearances required to other construction, if not indicated on accompanying Shop Drawings
   5. Submit Product Data before or concurrent with Samples.
   6. Submit Product Data in the following format:
      a. PDF electronic file

C. Shop Drawings: Prepare Project specific information, drawn accurately to scale.
   1. Submittals containing reproduction of Contract Drawings are not considered Shop Drawings and will be returned without action. Any delay due to such rejection will not be grounds for an extension of Contract Time.
   2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products
      b. Schedules
      c. Compliance with specified standards
      d. Notation of coordination requirements
      e. Notation of dimensions established by field measurement
      f. Relationship and attachment to adjoining construction clearly indicated
      g. Seal and signature of professional engineer if specified
   3. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
   4. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8 ½-inches by 11-inches but no larger than 30-inches by 42-inches.
   5. Submit Shop Drawings in the following format:
      a. For large format drawings and submittals (larger than 11 x 17), submit PDF file plus two (2) hard copies. For smaller format drawings and submittals (11x17 or less), provide only PDF file. Design Professional will return only the marked-up PDF.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
   1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
   2. Identification: Attach label on unexposed side of Samples that includes the following:
      a. Generic description of Sample
      b. Product name and name of manufacturer
c. Sample source  
d. Number and title of applicable Specification Section 

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.  
a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.  
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor. 

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.  
a. Number of Samples: Submit three (3) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Design Professional will return submittal with options selected. 

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.  
a. Number of Samples: Submit sets of Samples. Design Professional will retain one sample set; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.  
1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.  
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations. 

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:  
1. Type of product. Include unique identifier for each product indicated in the Contract Documents.  
2. Manufacturer and product name, and model number if applicable.  
3. Number and name of room or space  
4. Location within room or space  
5. Submit product schedule in the following format:  
a. PDF electronic file 

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section 013200, "Construction Progress Documentation". 

G. Application for Payment: Comply with requirements specified in Division 01 Section 012900, "Payment Procedures". 

H. Schedule of Values: Comply with requirements specified in Division 01 Section 012900, "Payment Procedures". 

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:  
1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Submit subcontract list in the following format:
   a. PDF electronic file
J. Coordination Drawings: Comply with requirements specified in Division 01 Section 013100, "Project Management and Coordination".
K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Design Professionals and owners, and other information specified.
M. Installer Certificates: Submit written statements on manufacturer’s letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
N. Manufacturer Certificates: Submit written statements on manufacturer’s letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
O. Product Certificates: Submit written statements on manufacturer’s letterhead certifying that product complies with requirements in the Contract Documents.
P. Material Certificates: Submit written statements on manufacturer’s letterhead certifying that material complies with requirements in the Contract Documents.
Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
R. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization
   2. Date of evaluation
   3. Time period when report is in effect
   4. Product and manufacturers’ names
   5. Description of product
   6. Test procedures and results
   7. Limitations of use
T. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section 014000, "Quality Requirements".
U. Pre-construction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
W. Field Test Reports: Submit reports indicating and interpreting results of field tests either performed during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
X. Maintenance Data: Comply with requirements specified in Division 01 Section 017823, "Operation and Maintenance Data".
Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions, other performance and design criteria, and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED DESIGN SERVICES
A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Design Professional.
B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
   1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW
A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Design Professional.
B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section 017700, "Closeout Procedures".
C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION
A. General: Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.
B. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
   1. Reviewed
   2. Revise and Resubmit
   3. Rejected
   4. Furnish As Corrected
   5. No Action Taken
C. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional will forward each submittal to appropriate party.
D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Design Professional.
E. Incomplete submittals are not acceptable, will be considered non-responsive, and will be returned without review.
F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION
**SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST**

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<th>Project:</th>
<th>From (Contractor):</th>
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<th>To (A/E):</th>
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List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

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<tr>
<th>Section Number</th>
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- Attachments

Signed by: ________________________________

Date: ________________________________

Copies:  □ Owner  □ Consultants  □ __________ □ __________ □ __________ □ __________ □ __________ □ __________ □ __________ □ __________ □ File
PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes:
   1. Products and installation for patching and extending Work within construction areas of existing facilities.
   2. Providing transition and adjustments
   3. Repair of damaged surfaces and finishes
B. Related Sections include the following:
   1. Division 01 Section 015000 “Temporary Facilities and Controls” for construction of temporary fire-rated partitions to separate existing occupied areas from construction areas.

1.3 OCCUPANCY, ACCESS, AND PROTECTION
A. Entire existing facility or any portion thereof will be occupied during progress of construction for conduct of normal operations. Phase Work in accordance with Section 011000, “Summary”.
B. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage. Perform work not to interfere with operations of occupied areas.
C. Existing facilities will remain in full operation during execution of this Work. Exercise every precaution to ensure safety and protection for existing facilities, occupants, merchandise, pedestrians, and vehicles. The following must meet required codes and accessibility requirements.
   1. Maintain safe access and egress at all times for occupants, pedestrians, and vehicles.
   2. Provide protection to prevent damage to facilities, merchandise, and vehicles from dust, water, weather, and other similar harmful elements. Refer to Section 015000, “Temporary Facilities and Controls” for additional requirements.
   3. Maintain exiting from facilities to provide safe passage complying with applicable codes.

1.4 SCHEDULING OF WORK
A. Make arrangements with Owner and schedule Work to avoid interference with normal operations of occupied areas. Submit schedule and summary of applicable Work within occupied areas and obtain Owner approval not less than two (2) days prior to commencement of such Work.
   1. Requests for use of certain existing loading docks, passage ways, and other similar spaces within areas outside limits of construction operations will be limited to day-by-day basis and must be approved in advance by Owner.
B. Coordinate access and scheduling of Work within tenant areas with Owner.

1.5 TORCH-CUTTING AND WELDING PROCEDURES
A. Notify Owner in advance of torch-cutting and welding operations performed within occupied areas; obtain approval prior to proceeding with such operations.
   1. Neither open-flame torch-cutting, welding nor arc-welding are allowed without having secured appropriate permit from Fire Marshal or authority having jurisdiction.
   2. Keep portable fire extinguisher of appropriate class within reach during welding or torch-cutting operations.
3. Screen arc-welding from vision of passersby.
   B. Maintain a “Fire Watch” for minimum of sixty (60) minutes after completion of each torch-cutting and welding operation.

1.6 UTILITY SERVICE OUTAGES
   A. Keep utility and service outages to minimum and perform only after written approval of Owner is received.
      1. Requests for outages will not be considered unless they include an identification of areas which will be affected by proposed outage.
      2. Schedule outages for times other than normal business hours.
      3. Make requests for outages minimum of five (5) calendar days in advance of proposed outage.
   B. Contractor: Responsible for investigating utility and service lines to determine effect of outage upon building operations outside of limit of operations. Obtain approval in advance from Owner to execute investigations.

1.7 KEYS
   A. When necessary to perform Work, Owner will issue keys to existing mechanical/electrical equipment spaces.
   B. Return keys at end of warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Type and Quality of Existing Products: Use products or types of construction that exist in structure, as needed to patch, extend, or match existing Work.
      1. Generally, Contract Documents do not define products or standards of workmanship present in existing construction.
      2. Determine by inspecting and testing products where necessary, referring to existing work as quality standard.
   B. New Materials: Comply with Specifications for each product involved.
      1. Match existing products and work for patching existing work.
   C. Materials for Temporary Fire-Rated Partitions: Comply with provisions of Division 01 Section 015000 “Temporary Facilities and Controls”.
   D. Salvaged Materials: Salvage sufficient quantities of cut or removed material to replace damaged Work of existing construction, when material is not readily obtainable on current market.
      1. Store salvaged items in dry, secure place on site.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Comply with provisions of Division 01 Section 017300, “Execution”.
      1. Responsible for verifying existing conditions to determine that all areas meet constructability and are ready for alteration and remodeling.
   B. Discrepancies: Verify dimensions and elevations indicated in layout of existing work.
      1. Prior to commencing work, carefully compare and check Contract Documents for discrepancies in locations or elevations of work to be executed.
      2. Refer discrepancies among Drawings and existing conditions to Design Professional for adjustment before work affected is performed.

3.2 PREPARATION
   A. Construct temporary fire-rated partitions to separate existing occupied areas from construction and alteration areas. Comply with provisions of Division 01 Section 015000, “Temporary
Facilities and Controls”.

B. Cut, move, or remove items as necessary for access to alteration and renovation Work.
   1. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, deteriorated masonry and concrete, and other deteriorated materials. Replace materials as specified for finished Work.
   2. Remove debris and abandoned items from area and from concealed spaces.

C. Cutting and Removal: Perform cutting and removal work to remove minimum necessary, and in manner to avoid damage to adjacent work. Cut finish surfaces such as masonry, tile, plaster, or metals by methods to terminate surfaces in straight line at natural point of division.

D. Prepare surfaces and remove surface finishes as necessary to provide for proper installation of new materials and finishes.

E. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

F. Provide temporary barriers and closures to control operations to prevent spread of dust to occupied portions of building; refer to Division 01 Section 015000, “Temporary Facilities and Controls”.

3.3 INSTALLATION
A. Coordinate Work of alterations and renovations to expedite completion and to accommodate Owner occupancy.

B. Remove, cut, and patch Work in manner to minimize damage and to provide means of restoring products and finishes to specified condition.
   1. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

C. Install products as specified in individual Specification sections.

D. Where new Work abuts or aligns with existing, perform smooth and even transition to match existing adjacent surface in texture and appearance.
   1. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and request instructions from Design Professional as to method of making transition.

3.4 ADJUSTMENTS
A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to provide smooth plane without breaks, steps, or soffits.

B. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

C. Fit Work at penetrations of surfaces as specified in Division 01 Section 017300, “Execution”.

D. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections. Repair substrate prior to application of finishes.

3.5 FINISHES
A. Finish new surfaces as specified in individual Specification sections.

B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.6 CLEANING
A. Comply with Division 01 Section 017700, “Closeout Procedures”. Thoroughly clean areas and spaces affected by Work. Completely remove paint, mortar, oils, putty and items of similar nature.

B. Clean Owner occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner occupied areas immediately.

END OF SECTION
QUALITY REQUIREMENTS

SECTION 01 4000

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for quality assurance and quality control.
   B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor’s other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality assurance and control services required by Design Professional, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
   C. Related Sections:
      1. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS
   A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
   B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Design Professional.
   C. Mockups: Full size physical assemblies that are constructed onsite. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
      1. Laboratory Mockups: Full-size, physical assemblies constructed at testing facility to verify performance characteristics.
      2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on the project site, consisting of multiple products, assemblies and subassemblies.
      3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
   D. Pre-construction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
   E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing
agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality Control Testing: Tests and inspections that are performed onsite for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Design Professional and Owner for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Design Professional for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.

2. Provide axonometric drawings for conditions difficult to illustrate in two (2) dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality Control Plan: For quality assurance and quality control activities and responsibilities.

B. Contractor's Quality Control Manager Qualifications: For supervisory personnel.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections
3. Description of test and inspection
4. Identification of applicable standards
5. Identification of test and inspection methods
6. Number of tests and inspections required
7. Time schedule or timespan for tests and inspections
8. Requirements for obtaining samples
9. Unique characteristics of each quality control service
1.7 CONTRACTOR'S QUALITY CONTROL PLAN
A. Quality Control Plan, General: Submit quality control plan within ten (10) days of Notice to Proceed, and not less than five (5) days prior to pre-construction conference. Submit in format acceptable to Design Professional. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality assurance and quality control responsibilities. Coordinate with Contractor's construction schedule.
B. Quality Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality assurance and quality control procedures similar in nature and extent to those required for Project.
1. Project quality control manager may also serve as Project superintendent.
C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
D. Testing and Inspection: Include in quality control plan a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor's elected tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections".
3. Owner performed tests and inspections indicated in the Contract Documents including tests and inspections indicated to be performed by the Commissioning Authority, if applicable.
E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Design Professional has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS
A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue
2. Project title and number
3. Name, address, and telephone number of testing agency
4. Dates and locations of samples and tests or inspections
5. Names of individuals making tests and inspections
6. Description of the Work and test and inspection method
7. Identification of product and Specification Section
8. Complete test or inspection data
9. Test and inspection results and an interpretation of test results
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector
13. Recommendations on retesting and re-inspecting
B. Manufacturer's Technical Representative’s Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE
A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST’s National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation
of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Pre-construction Testing: Where testing agency is indicated to perform pre-construction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   f. When testing is complete, remove test specimens, assemblies, mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality assurance service to Design Professional, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24-hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.

5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
C. Manufacturer's Field Services: Where indicated, engage a factory authorized service representative to inspect field assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section 013000, “Submittal Procedures”.

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

   1. Notify Design Professional and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Does not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work
   2. Incidental labor and facilities necessary to facilitate tests and inspections
   3. Adequate quantities of representative samples of materials that require testing and inspecting Assist agency in obtaining samples
   4. Facilities for storage and field curing of test samples
   5. Delivery of samples to testing agencies
   6. Preliminary design mix proposed for use for material mixes that require control by testing agency
   7. Security and protection for samples and for testing and inspecting equipment at Project site

H. Coordination: Coordinate sequence of 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.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
   2. Notifying Owner, Design Professional and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   3. Submitting a certified written report of each test, inspection, and similar quality-control service to Design Professional with copy to Contractor and to authorities having jurisdiction.
   4. Submitting a final report of special tests and inspections at Substantial Completion, this
includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

6. Retesting and re-inspecting corrected work

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted
   2. Description of the Work tested or inspected
   3. Date test or inspection results were transmitted to Design Professional
   4. Identification of testing agency or special inspector conducting test or inspection

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Design Professional's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section 017300, "Execution".

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY
A. Design and construction codes applicable to this project are the following:

1. National Fire Protection Association (NFPA)
   a. 2015 edition NFPA 1 Fire Code
   d. 2013 edition NFPA 14 Standards for the Installation of Standpipe and Hose Systems
   f. 2013 edition NFPA 24 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
   g. 2017 edition NFPA 70 National Electric Code
   h. 2013 edition NFPA 72 National Fire Alarm Signaling Code

2. International Building Code Conference (ICC)
   a. 2015 edition International Building Code,
   b. 2015 edition International Mechanical Code,
   c. 2015 edition International Plumbing Code,
   d. 2015 edition International Fire Code,
   1) Including Municipal fire code amendments of the city¹ where the building is being constructed, pertaining to the following shall be used in the project design and construction:
      i) water supply for fire suppression;
      ii) fire hydrant number and locations;
      iii) fire department access to the building;
      iv) KNOX® key access boxes – contact UNT System Fire Marshal for specifics;
      v) fire department connections;
      vi) fire sprinkler and standpipe systems;
      vii) fire hose connections;
      viii) fire alarm system;
      ix) elevator stretcher requirements;
      x) communication coverage;
      xi) other emergency equipment requirements.
   e. 2015 edition International Fuel Gas Code

3. Design & Construction Guidelines – The University of North Texas

¹ Respectively: City of Denton, TX; City of Ft. Worth, TX.; City of Dallas, TX; City of Frisco, TX

c. Questions regarding the Design & Construction Guidelines – The University of North Texas are to be emailed to: Peter.Palacios@unt.edu

4. Elevator and Escalator Construction
   a. Elevators, Escalators and Related Equipment, Administrative Rules of the Texas Department of Licensing and Regulation, 16 Texas Administrative Code, Chapter 74, §74.100 (Effective February 15, 2016).

5. Accessibility Standards

6. Energy Conservation Design Standards for New Construction and Major Renovation Projects:
   a. 2015 edition International Energy Conservation Code (IECC);
   b. Low-Rise Residential Buildings – use Residential Section of 2015 edition IECC.

7. Water Conservation Standards

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2 Major Renovation Projects: For the purposes of this subchapter, a major renovation project is a building renovation or improvement where the implementation cost associated with energy or water efficiency improvements is $2 million or more, based on the initial engineering cost estimate. 34 Tex. Admin. Code §19.33.

Source Note: The provisions of this §19.33 adopted to be effective August 13, 2002, 27 TexReg 7174; amended to be effective September 28, 2011, 36 TexReg 6303; amended to be effective April 7, 2016, 41 TexReg 2495.

3 Low-Rise Residential Building: Residential buildings not more than three stories in height above grade that includes sleeping accommodations and a separate means of egress, and where the occupants are primarily permanent in nature (30 or more days in occupancy).
SECTION 01 4200

REFERENCES

PART 1 - GENERAL

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

1.2 DEFINITIONS
A. General: Basic Contract definitions are included in the Conditions of the Contract.
B. "Approved": When used to convey Design Professional's action on Contractor's submittals, applications, and requests, "approved" is limited to Design Professional's duties and responsibilities as stated in the Conditions of the Contract.
C. "Directed": A command or instruction by Design Professional. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
H. "Provide": Furnish and install, complete and ready for the intended use.
I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS
A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS
A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the United States."
B. Following are acronyms used by Owner in the Contract Documents:
   1. A/E: Architect/Engineer

REFERENCES
REFERENCES

2. AHJ: Authority Having Jurisdiction
3. BOR: Board of Regents
4. CCD: Construction Change Directive
5. CCL: Construction Cost Limitation
6. CMAR: Construction Manager at Risk
7. CSP: Competitive Sealed Proposal
8. DD: Design Development
9. FPE: Fire Protection Engineer
10. GCs: General Conditions
11. GMP: Guaranteed Maximum Price
12. GSF: Gross Square Feet
13. HSP: HUB Subcontractor Plan
14. HUB: Historically Underutilized Business
15. LA: Landscape Architect
16. LEED: Leadership in Energy and Environmental Design
17. LDs: Liquidated Damages
18. NASF: Net Assignable Square Feet
19. NTP: Notice to Proceed
20. OAC: Owner/Architect/Contractor
21. OCM: Owner's Construction Manager
22. ODR: Owner's Designated Representative
23. PAR: Progress Assessment Report
24. PE: Professional Engineer
25. PM: Project Manager
26. RID: Registered Interior Designer
27. R&R: Repair and Rehabilitation
28. SD: Schematic Design
29. SDs: Schematic Design Drawings
30. UGC/SGC: Uniform General Conditions/Supplemental General Conditions

END OF SECTION
PART 1 - GENERAL

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

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

1.3 USE CHARGES
A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's own forces, Design Professional, testing agencies, and authorities having jurisdiction.
B. Sewer Service: Owner will pay sewer service use charges for sewer usage by all entities for construction operations.
C. Water Service: Owner will pay water service use charges for water used by all entities for construction operations.
D. Electric Power Service: Owner will pay electric power service use charges for electricity used by all entities for construction operations.
E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS
A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
   1. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
D. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
   1. Locations of dust-control partitions at each phase of the work
   2. HVAC system isolation schematic drawing
   3. Location of proposed air filtration system discharge
   4. Other dust-control measures
5. Waste management plan
6. Comply with other requirements on a per Campus basis

1.5 QUALITY ASSURANCE
A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS
A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6-feet high with galvanized steel pipe posts; minimum 2¾-inch OD line posts and 2¾-inch OD corner and pull posts, with 1¾-inch OD top rails.
B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized steel, chain-link fabric fencing; minimum 6-feet high with galvanized steel pipe posts; minimum 2¾-inch OD line posts and 2¾-inch OD corner and pull posts, with 1¾-inch OD top and bottom rails. Provide galvanized steel bases for supporting posts.
C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
D. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES
A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Design Professional, Construction Manager, and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
   1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
   2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
   3. Drinking water and private toilet.
   5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
   6. Lighting fixtures capable of maintaining average illumination of 20 FC at desk height.
C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.
2.3 EQUIPMENT
   A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
   B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
      1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
      2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
      3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section 017700 "Closeout Procedures".
   C. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
   A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
      1. Locate facilities to limit site disturbance as specified in Division 01 Section 011000, "Summary."
   B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION
   A. General: Install temporary service or connect to existing service.
      1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
   B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
      1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
   C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
   D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
   E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
   F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
      1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
         a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
         b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.

3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

J. Telephone:

1. Post a list of important telephone numbers.
   a. Police and fire departments
   b. Ambulance service
   c. Contractor's home office
   d. Architect's office
   e. Engineers' offices
   f. Owner's office
   g. Principal subcontractors' field and home offices

2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30-feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Design Professional schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install sub-base and base for temporary roads and paved areas according to Division 31 Section [Insert Section number], "Earth Moving".
3. Recondition base after temporary use, including removing contaminated material, re-grading, proof rolling, compacting, and testing.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.
F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Identification Signs: Provide Project identification signs as indicated on Drawings.
   2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
      a. Provide temporary, directional signs for construction personnel and visitors.
   3. Maintain and touchup signs so they are legible at all times.
G. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section 017419, "Construction Waste Management and Disposal."
H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
I. Temporary Elevator Use: Refer to Division 14 Sections for temporary use of new elevators.
J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION
A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Division 01 Section 011000, "Summary."
B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
D. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.
   1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
E. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
   1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
   2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side.
      Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant treated plywood.
   3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
   4. Insulate partitions to control noise transmission to occupied areas.
   5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
   6. Protect air-handling equipment.
   7. Provide walk-off mats at each entrance through temporary partition.
F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types
needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL
A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty-four (24) hour basis where required to achieve indicated results and to avoid possibility of damage.
C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section 017700, "Closeout Procedures."

END OF SECTION
MOLD PREVENTION MEASURES

SECTION 01 5300

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes: Administrative and procedural requirements to help prevent mold contamination in construction. This section is in addition to requirements contained in Division 01 Section 015000, "Temporary Facilities and Controls".

1.3 SUBMITTALS
A. Reports: Submit reports required in this Section, including but not limited to the following:
   1. Sightings of existing mold
   2. Window and storefront testing
   3. Moisture contents of materials
   4. Exterior sealant cracks, damage, and deterioration

1.4 QUALITY ASSURANCE
A. Pre-construction Meeting: Review requirements of this Section at Pre-construction Meeting.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
B. Do not bring finish materials into building until building is in a conditioned state. Protect finish materials stored within building. Stage materials off the floor and cover with waterproof covering. Examples of these materials include, but are not limited to, insulation, gypsum products, wall coverings, carpet, ceiling tile, wood products, etc.
C. Remove from Project site damaged materials or materials that have become wet. Do not install such materials.

1.6 PROJECT CONDITIONS
A. Perform daily visual inspections of existing building for existing mold. Report sightings of mold to Architect.
B. Remove water found within building during construction immediately.
   1. Energize lift stations and sump pumps as early in Project as possible. Use temporary pumps if necessary to get water out of building and drain lines.
C. Ventilation:
   1. Verify that existing HVAC system is providing positive pressure in building.
   2. Provide adequate air circulation and ventilation during demolition phase(s).
   3. Seal off return air ducts and diffusers to prevent construction dust and moisture from entering occupied areas and HVAC system.
   4. Provide temporary outside air ventilation as building becomes enclosed.
D. Maintain clean project site, free from hazards, garbage, and debris.
E. Eating, drinking, and smoking are not permitted within building.
F. Slope perimeter grades, both temporary and final grades, away from building structure.
G. Verify that condensate pans drain properly beginning with initial installation.
H. Flash roof penetrations immediately. Do not allow water to penetrate to floor below.
I. Seal window openings prior to window installation with plastic to prevent moisture entry.
J. Sprayed-on Fireproofing: Keep air moving throughout building when using sprayed-on fireproofing.
K. Cover stored and installed ductwork and installed duct openings with plastic to prevent dust, debris, and moisture from entering ductwork. Repair damaged plastic barrier.
L. Do not operate air handling equipment below 60°F supply air temperature until building is 100 percent enclosed.
M. Monitor humidity and temperature for conformance to installation requirements defined by material and equipment manufacturers.
N. Check moisture content of gypsum board prior to applying finishes. Record findings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION
A. Roof Drains: Connect roof drains to risers and storm drainage lines as soon as possible.
B. Floor Drains: Connect floor drains as soon as possible. Cover floor drains with tape during construction to keep construction debris from blocking drain. Clean out floor drain lines to mains prior to Substantial Completion.
C. Wall Assemblies:
   1. Install exterior wall insulation, vapor retarder, and gypsum board only after building is enclosed.
   2. Keep bottom of installed gypsum board off floor ½-inch.
D. Cavity Conditions: Clean and inspect cavity conditions prior to covering, sealing, or restricting access. Vacuum-clean cavity spaces prior to covering or enclosing.
E. Sprayed-On Fireproofing: Remove sprayed-on fireproofing overspray immediately.
F. Roof Mounted Equipment: Inspect rooftop units and other roof-mounted equipment for signs of rain leaks immediately after first rain. Water test with hose immediately after installation. Seal leaks immediately.
H. Windows and Storefront: Water test windows to manufacturer’s and Project Manual’s specifications. Record findings and forward to Architect.
I. HVAC Equipment (Permanent HVAC Equipment Used for Temporary Conditioning of Building During Construction Phases): Change filters and clean ductwork interior to remove dirt, dust, debris, and moisture buildup prior to turning Project over to Owner.

3.2 ADJUSTING
A. Remove damaged materials or materials that have become wet. Replace with new materials.

3.3 DEMONSTRATION
A. Train and educate Owner’s maintenance personnel on use of building systems. Explain how improper operation and shutting down systems during off periods can create mold problems.
B. Schedule with Owner a review of building for mold problems at 1-year warranty walk-through. Inspect exterior sealants and masonry joints for cracks and other damage or deterioration where water can penetrate building envelope.
C. Explain to Owner the need for Owner to establish annual building review for mold.

END OF SECTION
SECTION 01 5720

INDOOR AIR QUALITY PLAN DURING CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Requirements to develop and utilize an indoor air quality plan for the construction operation.
   2. A sample plan applicable to all interior construction and trades.
   3. Reference:

1.2 TRAINING
A. Contractor shall provide copies of the plan and training to all subcontractors and appropriate personnel.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION
A. Contractor shall utilize a plan to protect the indoor environments from contamination during construction and finish out similar to the following plan.
B. Contractor shall enforce and verify compliance by all personnel and subcontractors.
C. Contractor shall take pictures of the related construction operations to verify conformance to each section of the plan. These pictures will be provided to the Architect. A minimum of eighteen (18) pictures (six (6) pictures taken on three (3) separate occasions) will be submitted.

3.2 INDOOR AIR QUALITY PLAN DURING CONSTRUCTION OPERATIONS
A. Introduction
   1. This plan outlines the processes required to assure acceptable air quality. Elements of the program include:
      a. HVAC Protection and Containing the work area
      b. Source Control and Modifying HVAC Operation and Reducing Emissions
      c. Pathway Interruptions
      d. Intensifying Housekeeping
      e. Scheduling or Relocation of Occupants

3.3 THESE REQUIREMENTS APPLY TO ALL PARTIES INVOLVED IN DESIGN, CONSTRUCTION, AND BUILDING MOVE IN:
A. CONTAMINANTS
   1. Air contaminants include many different materials. These may include: gases, vapors, chemicals, mold/fungus, pathogens, allergens, particulates and radiation. Eliminating all of these is not possible but reducing the introduction and distribution of these contaminants is possible and desirable. The programs outlined in the following pages are intended to reduce contaminants and provide as clean a building as possible for the residents.
   2. The following sections outline procedures and precautions to reduce building contamination and meet the requirements for a healthy environment.
B. CONSTRUCTION OPERATIONS
1. HVAC PROTECTION: The air conditioning system is the distribution method for air and potential contaminants throughout the building. Keeping the system clean is a necessity.
   a. All air handling equipment, spiral and fabricated ducts and accessories shall be kept clean during transportation, storage and assembly.
   b. All lined, spiral and assembled ducts shall be wrapped and protected from dirt and water during transportation and storage.
   c. All insulation and lined duct shall be kept dry at all times. Any insulation that has become wet shall be removed and replaced.
   d. Fiberglass duct board in the air handlers and bases shall be kept dry and clean. Exposed fiberglass subject to erosion shall be coated with a sealer to prevent the entry of raw fiberglass into the air stream.
      1) Water will not be allowed to stand on any mechanical equipment.
   e. All open ends of installed duct and equipment shall be covered and sealed to prevent the entry of dirt.
   f. All zone boxes shall be wrapped and sealed from dirt and water before installation. Installed zone boxes shall have the openings sealed until permanently connected to the ductwork.
   g. All dampers and attenuators into open chases and ducts shall be covered to reduce dirt entry.
   h. The air handlers shall not be started without MERV 8 filtration in place. Upon system activation, install sheet media on all return openings and filters in zone box plenum openings. These filters must be monitored and changed as necessary to prevent the entry of dirt into the system. The temporary media shall be removed after building flush out and before occupancy.
   i. The return air system should not be used during sheet rock installation, sanding or painting operations.
   j. The building should be kept under a positive pressure as much as possible.
   k. Chase dampers shall be kept closed until the system is activated.
   l. Complete the initial mechanical checklists at system startup.
   m. Replace final filters with new filters before flush out or occupancy per design requirements.

2. SOURCE CONTROL
   a. No smoking or tobacco materials shall be allowed on all campuses.
   b. No gasoline or fuel-fired equipment shall be used inside any enclosed building.
   c. Wet processes within the building shall be kept to a minimum.
   d. All chase and wallboard materials shall be protected from water. All damaged materials shall be removed and replaced.
   e. Use low-emission materials and chemicals.
   f. All cleaning involving chemicals shall be performed outside the building wherever possible.
   g. All carpet materials shall be unrolled or unboxed and aired out in a well-ventilated warehouse for a minimum of three days before installation.
   h. All modular furniture shall be aired out in a well-ventilated warehouse for seven days before entry into the building.
   i. Trash shall be cleaned up and removed daily to the appropriate recycle container.
   j. Any mold growth shall be treated according to the procedures shown in the New York City Department of Health “Guidelines on Assessment and Remediation of Fungi in Indoor Environments”.
   k. Clean the inside of all walls at the base track to remove excess materials and dirt with a vacuum cleaner before enclosing the wall. This is particularly critical on walls with plumbing or water piping included.
   l. HEPA vacuum all concrete floors before installation of floor covering materials.
   m. No obvious mold or chemical contamination shall be enclosed, hidden or painted.

3. PATHWAY INTERRUPTION
a. Dust-producing operations shall be exhausted to the outside to the extent possible.
b. Exhaust fans may be installed on each floor to remove dust and contaminants.
c. The air handler shall supply conditioned air to the floors. Floors with heavy dust or chemical operations shall be exhausted to the outside.
d. During rain or high-humidity conditions, the air supply coming from the coils shall be cooled to 55°F or the air handler stopped to prevent moist air entry into the building. Exhaust fans shall not draw moist air into the building. It is preferable to have little airflow to moist air entering the building.
e. Return air dampers and openings shall be covered with filter media during operations that may contaminate the system.
f. During activities producing airborne particulates in occupied buildings undergoing renovation, or projects whose airspace is connected to occupied buildings, dust producing activities such as, but not limited to, demolition, sanding, buffing, and welding, the Contractor will provide commercial high volume air scrubbers at the rate of 1 per 7000 square feet, operate them continuously, and service them per the manufacturer, including high-efficiency particulate arrestance (HEPA) filter replacement.

4. HOUSEKEEPING
   a. Food or food residues shall be properly disposed after meals or breaks.
   b. Once the building is enclosed with finishes applied, keep dirt entry to a minimum with walk off mats at all entrances. Clean the mats at least daily.
   c. All sweeping shall be done with dust reducing wax-based sweeping compounds.
   d. All materials shall be kept clean and stored neatly on dunnage or pallets as required by the manufacturer.
   e. Coils, fans, and air handler chambers, including return air chambers, shall be inspected and cleaned if required before start up, final testing and commissioning, and air testing.
   f. All workers shall utilize the proper personal protective equipment per OSHA standards during any operation involving chemicals and dust production.
   g. No food, drink, or smoking shall be allowed within the building after the building is enclosed.

5. SCHEDULING
   a. Complete all dust producing and chemical operations before the installation of “sink” materials such as carpet and ceiling tile.
   b. Complete the HVAC control system sufficient to allow the operation of the supply and exhaust systems to control pressurization and contaminants.
   c. Group contaminating operations where possible to maximize exhaust use.

END OF SECTION
PRODUCT REQUIREMENTS

SECTION 01 6000

PART 1 - GENERAL

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

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

1.3 DEFINITIONS
   A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken
      from previously purchased stock. The term "product" includes the terms "material", "equipment",
      "system", and terms of similar intent.
      1. Named Products: Items identified by manufacturer's product name, including make or
         model number or other designation shown or listed in manufacturer's published product
         literature, which is current as of date of the Contract Documents.
      2. New Products: Items that have not previously been incorporated into another project or
         facility. Products salvaged or recycled from other projects are not considered new
         products.
      3. Comparable Product: Product that is demonstrated and approved through submittal
         process to have the indicated qualities related to type, function, dimension, in-service
         performance, physical properties, appearance, and other characteristics that equal or
         exceed those of specified product.
   B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product
      is named and accompanied by the words "basis-of-design product", including make or model
      number or other designation, to establish the significant qualities related to type, function,
      dimension, in-service performance, physical properties, appearance, and other characteristics
      for purposes of evaluating comparable products of additional manufacturers named in the
      specification.

1.4 ACTION SUBMITTALS
   A. Comparable Product Requests: Submit request for consideration of each comparable product.
      Identify product or fabrication or installation method to be replaced. Include Specification Section
      number and title and Drawing numbers and titles.
      1. Include data to indicate compliance with the requirements specified in "Comparable
         Products" Article.
      2. Design Professional's Action: If necessary, Design Professional will request additional
         information or documentation for evaluation within one week of receipt of a comparable
         product request. Design Professional will notify Contractor of approval or rejection of
         proposed comparable product request within fifteen (15) days of receipt of request, or
         seven (7) days of receipt of additional information or documentation, whichever is later.
            a. Form of Approval: As specified in Division 01 Section 013300, "Submittal
               Procedures".
            b. Use product specified if Design Professional does not issue a decision on use of a
               comparable product request within time allocated.
   B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01
      Section 013300, "Submittal Procedures". Show compliance with requirements.
1.5 QUALITY ASSURANCE
   A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

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

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

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

1.7 PRODUCT WARRANTIES
   A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
      1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
      2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

   B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
      1. Manufacturer's Standard Form: Modified to include Project specific information and properly executed.
      2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
      3. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.

   C. Submittal Time: Comply with requirements in Division 01 Section 017700, "Closeout Procedures".
PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected", Design Professional will make selection.
   6. Or Equal: For products specified by name and accompanied by the term "or equal", or "or approved equal", or "or approved", comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:
   1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   3. Products:
      a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.
      b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
   4. Manufacturers:
      a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.
      b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
   5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

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

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section 012500, “Substitution Procedures” for proposal of product.

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

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Design Professional will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, it is consistent with the Contract Documents, will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of Design Professionals and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout
   2. Field engineering and surveying
   3. Installation of the Work
   4. Cutting and patching
   5. Coordination of Owner installed products
   6. Progress cleaning
   7. Starting and adjusting
   8. Protection of installed construction
   9. Correction of the Work

1.3 DEFINITIONS
A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS
A. Qualification Data: For land surveyor
B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
C. Certified Surveys: Submit two (2) paper copies that are certified, sealed and signed by a Texas registered professional land surveyor. Also submit one copy of the survey in CAD format using surface coordinates and one copy of the survey in CAD format using grid coordinates. Coordinate with Owner for the reference coordinate system and CAD guidelines.
D. Final Property Survey: Submit one (1) digital copy that is certified, sealed and signed by a Texas registered professional land surveyor showing the Work performed. Also submit one copy of the survey in CAD format using surface coordinates and one copy of the survey in CAD format using grid coordinates. Coordinate with Owner for the reference coordinate system and CAD guidelines.

1.5 QUALITY ASSURANCE
A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Structural Elements: When cutting and patching structural elements, notify Design Professional of locations and details of cutting and await directions from the Design Professional before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could
change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include the following:
   a. Primary operational systems and equipment
   b. Fire separation assemblies
   c. Air or smoke barriers
   d. Fire-suppression systems
   e. Mechanical systems piping and ducts
   f. Control systems
   g. Communication systems
   h. Conveying systems
   i. Electrical wiring systems
   j. Operating systems of special construction

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
   a. Water, moisture, or vapor barriers
   b. Membranes and flashings
   c. Exterior curtain-wall construction
   d. Equipment supports
   e. Piping, ductwork, vessels, and equipment
   f. Noise- and vibration-control elements and systems

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Design Professional's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

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

D. Manufacturer's Installation Instructions: Obtain and maintain onsite manufacturer's written recommendations and instructions for installation of products and equipment.

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

PART 2 - PRODUCTS
2.1 MATERIALS
A. General: Comply with requirements specified in other Sections.
   1. For projects requiring compliance with sustainable design and construction practices and procedures, utilize products for patching that comply with requirements of Division 01 Section 018114, "Sustainable Design Requirements".
B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed,
will provide a match acceptable to the Design Professional for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work. Surveyor will perform a Locative Survey (Category 3) according to the standards set by the Texas Society of Professional Surveyors Manual of Practice.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
   3. Collect and depict all utility infrastructure according to the Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data published by the American Society of Civil Engineers, publication number CI/ASCE 38-02. All utility data must have a quality level clearly associated, either via a geospatial database, CAD layering, plan symbols, and/or plan labels per the guidelines. Design Professional or Engineer will work with Owner to explain and detail costs and benefits so as to achieve the highest quality levels of subsurface utility engineering applicable to the Project and Work.
B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
      a. Description of the Work
      b. List of detrimental conditions, including substrates
      c. List of unacceptable installation tolerances
      d. Recommended corrections
   2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION
A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Design Professional according to requirements in Division 01 Section 013100, "Project Management and Coordination".

3.3 CONSTRUCTION LAYOUT
A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Design Professional promptly.
B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level, and plumb of every major element as the Work progresses.
   5. Notify Design Professional when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Design Professional.

3.4 FIELD ENGINEERING
A. Identification: Owner will identify existing benchmarks, control points, and property corners.
B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner and Design Professional. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Design Professional before proceeding.
   2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
C. Benchmarks: Establish, construct and maintain a minimum of two permanent benchmarks on Project site, referenced to Owner's established geographic coordinate system. Benchmarks will function as both horizontal and vertical benchmarks. A registered professional land surveyor must establish the new benchmarks to meet specifications of National Geodetic Survey (NGS) Class RT1 surveys per the latest version of the User Guidelines for Single Base Real Time GNSS Positioning publication. New and re-set benchmarks will comply with the guidelines specified by Appendix B of the Bench Mark Reset Procedures document published by the NGS agency.
   1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Mapping As-built Conditions: Once inspected and approved by Owner, all underground utility locations will be mapped using GPS mapping equipment to decimeter precision or better, prior to backfill, to collect geospatial data on as-built conditions. Any work covered prior to mapping will be required to be uncovered at no cost or schedule impact to the project. Consult with Owner for guidelines on how to collect the geospatial data and what information needs to be recorded about each utility feature. This information will be incorporated into the project record drawings to indicate the horizontal and vertical location of facilities, easements and improvements, as built.

3.5 INSTALLATION
A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
B. Comply with manufacturer’s written instructions and recommendations for installing products in applications indicated.
C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
E. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.
F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory-prepared and field-installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Design Professional.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING
A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
B. Temporary Support: Provide temporary support of work to be cut.
C. Protection: Protect in-place construction during cutting and patching to prevent damage.
protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section 011000, "Summary".

E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned; bypass such services/systems before cutting to prevent interruption to occupied areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.

   b. Restore damaged pipe covering to its original condition.

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

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

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

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.
B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
   1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
   2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING
A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   2. Do not hold waste materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80°F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Utilize containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
B. Site: Maintain Project site free of waste materials and debris.
C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section 015000, "Temporary Facilities and Controls" and Division 01 Section 017419, "Construction Waste Management and Disposal".
H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING
A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section 019113, "General Commissioning Requirements".
B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section 014000, “Quality Requirements”.

3.10 PROTECTION OF INSTALLED CONSTRUCTION
A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.11 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
B. Restore permanent facilities used during construction to their specified condition.
C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for the following:
      1. Salvaging non-hazardous demolition and construction waste
      2. Recycling non-hazardous demolition and construction waste
      3. Disposing of non-hazardous demolition and construction waste

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

1.4 PERFORMANCE REQUIREMENTS
   A. General: Achieve end-of-Project rates for salvage/recycling a minimum of seventy-five percent
      (75%) by weight of total non-hazardous solid waste generated by the Work. Practice efficient
      waste management in the use of materials in the course of the Work. Use all reasonable means
      to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and
      salvage of materials, including the following:
      1. Demolition Waste:
         a. Concrete
         b. Concrete reinforcing steel
         c. Brick
         d. Concrete masonry units
         e. Doors and frames
         f. Door hardware
         g. Metal studs
         h. Gypsum board
         i. Acoustical tile and panels
         j. Carpet
         k. Carpet pad
         l. Plumbing fixtures
         m. Piping
         n. Mechanical equipment
         o. Refrigerants
         p. Electrical conduit
2. Construction Waste:
   a. Site-clearing waste
   b. Masonry and CMU
   c. Lumber
   d. Wood sheet materials
   e. Wood trim
   f. Metals
   g. Carpet and pad
   h. Gypsum board
   i. Piping
   j. Electrical conduit
   k. Packaging: Regardless of salvage/recycle goal indicated in paragraph above, salvage or recycle one-hundred percent (100%) of the following uncontaminated packaging materials:
      1) Paper
      2) Cardboard
      3) Boxes
      4) Plastic sheet and film
      5) Polystyrene packaging
      6) Wood crates
      7) Plastic pails

1.5 ACTION SUBMITTALS
A. Waste Management Plan: Submit plan within thirty (30) days of date established for commencement of the Work.

1.6 INFORMATIONAL SUBMITTALS
A. Waste Reduction Progress Reports: Concurrent with LEED Submittal. Include the following information:
   1. Material category
   2. Generation point of waste
   3. Total quantity of waste in tons
   4. Quantity of waste salvaged, both estimated and actual in tons
   5. Quantity of waste recycled, both estimated and actual in tons
   6. Total quantity of waste recovered (salvaged plus recycled) in tons
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste
B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
E. LEED Submittal: LEED letter template for Credit MRC5, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
F. Qualification Data: For waste management coordinator refrigerant recovery technician.
G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for
recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE
A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of Projects with similar requirements.
B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section 013100, "Project Management and Coordination". Review methods and procedures related to waste management including, but not limited to, the following:
   1. Review and discuss waste management plan including responsibilities of waste management coordinator.
   2. Review requirements for documenting quantities of each type of waste and its disposition.
   3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
   4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
   5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN
A. General: Develop a waste management plan according to ASTM E 1609 and requirements of this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
B. Waste Identification: Indicate anticipated types and quantities of demolition, site clearing, and construction waste generated by the Work. Use attached form or comparable generated by Contractor. Include estimated quantities and assumptions for estimates.
C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
   1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
   2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
   3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
   4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
   5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
   6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan.
PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
   1. Comply with Division 01 Section 015000, "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
   1. Distribute waste management plan to everyone concerned within three days of submittal return.
   2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
   2. Comply with Division 01 Section 015000, "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until installation.
   4. Protect items from damage during transport and storage.
   5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: NOT Permitted on Project site.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Plumbing Fixtures: Separate by type and size.

F. Lighting Fixtures: Separate lamps by type and protect from breakage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

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

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

END OF SECTION
 SECTION 01 7700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures
   2. Final completion procedures
   3. Warranties
   4. Final cleaning

1.3 SUBSTANTIAL COMPLETION
A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver attic stock and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   11. Advise Owner of changeover in heat and other utilities.
   12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   13. Complete final cleaning requirements, including touchup painting.
   14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for final completion.
1.4 FINAL COMPLETION
A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
   1. Submit a final Application for Payment according to Division 01 Section 012900, “Payment Procedures”.
   2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Submit pest-control final inspection report and warranty.
   5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected. Include cost for re-inspection based on incomplete work of the Contractor.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)
A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A attached or form provide by Contractor and approved by Owner and Architect.
   1. Organize list of spaces in sequential order, starting with exterior areas first.
   2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
   3. Include the following information at the top of each page:
      a. Project name
      b. Date
      c. Name of Architect
      d. Name of Contractor
      e. Page number
   4. Submit list of incomplete items in the following format:
      a. PDF electronic file

1.6 WARRANTIES
A. Submittal Time: Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
D. Provide additional copies of each warranty to include in operation and maintenance manuals. Included digital copies of each warranty within appropriate division of operations and maintenance manuals.
E. After final assembly, scan entire warranty binder into PDF format and deliver to Owner. Deliver entire closeout package to owner in PDF format on a thumb drive.

PART 2 - PRODUCTS
2.1 MATERIALS
A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
   1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

   b. Sweep paved areas clean. Remove petrochemical spills, stains, and other foreign deposits.

   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

   d. Remove tools, construction equipment, machinery, and surplus material from Project site.

   e. Remove snow and ice to provide safe access to building.

   f. Clean exposed exterior and interior hard-surfac ed finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

   g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

   h. Sweep concrete floors clean in unoccupied spaces.

   i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

   j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

   k. Remove labels that are not permanent.

   l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

      1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

   m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

   n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

   o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

   p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

   q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.


   r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
s. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section 017419, "Construction Waste Management and Disposal".

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
      1. Operation and maintenance documentation directory
      2. Emergency manuals
      3. Operation manuals for systems, subsystems, and equipment
      4. Product maintenance manuals
      5. Systems and equipment maintenance manuals

1.3 DEFINITIONS
   A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
   B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS
   A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
      1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.
   B. Format: Submit operations and maintenance manuals in the following format:
      a. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Design Professional.
         a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
         b. Enable inserted reviewer comments on draft submittals.
      b. One (1) paper copy. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Design Professional will return.
   C. Initial Manual Submittal: Submit draft copy of each manual to Owner and Design Professional at least thirty (30) days before commencing demonstration and training. Design Professional, Owner, and Commissioning Agent will comment on whether general scope and content of manual are acceptable.
   D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Design Professional and Commissioning Agent will return copy with comments.
      1. Correct or modify each manual to comply with Design Professional's and Commissioning Agent's comments. Submit copies of each corrected manual within fifteen (15) days of receipt of Design Professional's and Commissioning Agent’s comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY
A. Organization: Include a section in the directory for each of the following:
   1. List of documents
   2. List of systems
   3. List of equipment
   4. Table of contents

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of a system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4-2008, "Preparation of Operating and Maintenance Documentation for Building Systems".

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page
   2. Table of contents
   3. Manual contents

B. Title Page: Include the following information:
   1. Subject matter included in manual
   2. Name and address of Project
   3. Name and address of Owner
   4. Date of submittal
   5. Name and contact information for Contractor
   6. Name and contact information for Construction Manager
   7. Name and contact information for Design Professional
   8. Name and contact information for Commissioning Agent
   9. Names and contact information for major consultants to the Design Professional that designed the systems contained in the manuals.
   10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
   1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
   1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
   2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and
subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily-navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound, and labeled volumes.
   1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf or post-type binders, in thickness necessary to accommodate contents, sized to hold 8½ by 11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
      a. If two (2) or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
      b. Identify each binder on front and spine, with printed title “OPERATION AND MAINTENANCE MANUAL”, Project title or name and subject matter of contents. Indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
   2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
   3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
   4. Supplementary Text: Prepared on 8½ by 11-inch white bond paper.
   5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
      a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
      b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS
   A. Content: Organize manual into a separate section for each of the following:
      1. Type of emergency
      2. Emergency instructions
      3. Emergency procedures
   B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
      1. Fire
      2. Flood
      3. Gas leak
      4. Water leak
      5. Power failure
      6. Water outage
      7. System, subsystem, or equipment failure
      8. Chemical release or spill
   C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
   D. Emergency Procedures: Include the following, as applicable:
      1. Instructions on stopping
      2. Shutdown instructions for each type of emergency
      3. Operating instructions for conditions outside normal operating limits
4. Required sequences for electric or electronic systems
5. Special operating instructions and procedures

2.4 OPERATION MANUALS
A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards
4. Operating procedures
5. Operating logs
6. Wiring diagrams
7. Control diagrams
8. Piped system diagrams
9. Precautions against improper use
10. License requirements including inspection and renewal dates
B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name
3. Equipment identification with serial number of each component
4. Equipment function
5. Operating characteristics
6. Limiting conditions
7. Performance curves
8. Engineering data and tests
9. Complete nomenclature and number of replacement parts
C. Operating Procedures: Include the following, as applicable:
1. Startup procedures
2. Equipment or system break-in procedures
3. Routine and normal operating instructions
4. Regulation and control procedures
5. Instructions on stopping
6. Normal shutdown instructions
7. Seasonal and weekend operating instructions
8. Required sequences for electric or electronic systems
9. Special operating instructions and procedures
D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS
A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
C. Product Information: Include the following, as applicable:
1. Product name and model number
2. Manufacturer's name
3. Color, pattern, and texture
4. Material and chemical composition
5. Reordering information for specially manufactured products

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures
   2. Types of cleaning agents to be used and methods of cleaning
   3. List of cleaning agents and methods of cleaning detrimental to product
   4. Schedule for routine cleaning and maintenance
   5. Repair instructions

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers’ maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers’ Maintenance Documentation: Manufacturers’ maintenance documentation including the following information for each component part or piece of equipment:
   1. Standard maintenance instructions and bulletins
   2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly
   3. Identification and nomenclature of parts and components
   4. List of items recommended to be stocked as spare parts

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
   1. Test and inspection instructions
   2. Troubleshooting guide
   3. Precautions against improper maintenance
   4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   5. Aligning, adjusting, and checking instructions
   6. Demonstration and training video recording, if available

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
   1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
   2. Maintenance and Service Record: Include manufacturers’ forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers’ maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION AND DELIVERY

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
   1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
   2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
   1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
   1. Do not use original project record documents as part of operation and maintenance manuals.
   2. Comply with requirements of newly prepared record Drawings in Division 01 Section 017839, "Project Record Documents".

G. Comply with Division 01 Section 017700, "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

H. Include transmittal with all deliveries to Owner. Request receipt confirmation.

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes administrative and procedural requirements for project record documents, including the following:
      1. Record Drawings
      2. Record Specifications
      3. Record Product Data
      4. Miscellaneous record submittals

1.3 DEFINITIONS
   A. Geospatial Data: Data or information that identifies the geographic location of features and boundaries in relation to the Owner’s coordinate system.

1.4 CLOSEOUT SUBMITTALS
   A. Record Drawings: Comply with the following:
      1. Number of Copies: Submit copies of record Drawings as follows:
         a. Initial Submittal: Submit one (1) paper copy and PDF electronic files of marked-up record prints and one (1) set of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
         b. Final Submittal: Submit one (1) paper copy, PDF electronic files, CADD and BIM of marked-up record prints, one (1) set of record digital data files, and three (3) sets of record digital data file plots. Plot each drawing file, whether or not changes and additional information were recorded.
         c. Architect will amend record CADD files for submission to Owner at completion of project.
   B. Record Specifications: Submit one (1) paper copy and one (1) PDF copy of Project’s Specifications, including addenda and contract modifications.
   C. Record Product Data: Submit one (1) paper copy, one (1) PDF copy of each submittal, and one (1) CoBIE format.
      1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
   D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one (1) paper copy of each submittal.
   E. Reports: Submit written report indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS
   A. Record Prints: Maintain one (1) set of marked-up paper copies of the Contract Drawings and Shop Drawings.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
   a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later
   b. Accurately record information in an acceptable drawing technique
   c. Record data as soon as possible after obtaining it
   d. Record and check the markup before enclosing concealed installations
   e. Cross-reference record prints to corresponding archive photographic documentation

2. Content: Types of items requiring marking include, but are not limited to, the following:
   a. Dimensional changes to Drawings
   b. Revisions to details shown on Drawings
   c. Depths of foundations below first floor
   d. Locations and depths of underground utilities
   e. Revisions to routing of piping and conduits
   f. Revisions to electrical circuitry
   g. Actual equipment locations
   h. Duct size and routing
   i. Locations of concealed internal utilities
   j. Changes made by Change Order or Construction Change Directive
   k. Changes made following Architect's written orders
   l. Details not on the original Contract Drawings
   m. Field records for variable and concealed conditions
   n. Record information on the Work that is shown only schematically

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
   1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
   2. Format: As approved by Owner.
   3. Format: Annotated PDF electronic file with comment function enabled.
   4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
   5. Refer instances of uncertainty to Architect through Construction Manager for resolution.
   6. Incorporate geospatial data collected during construction and installation to more accurately reflect as-built conditions.

C. Newly-Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
   1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
   2. Consult Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply
with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
   1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
   2. Format: Annotated PDF electronic file with comment function enabled.
   3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
   4. Identification: As follows:
      a. Project name
      b. Date
      c. Designation "PROJECT RECORD DRAWINGS"
      d. Name of Architect and Construction Manager
      e. Name of Contractor

2.2 RECORD SPECIFICATIONS
   A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
      1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
      2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
      3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
      4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
      5. Note related Change Orders, record Specifications, and record Drawings where applicable.
   B. Format: Submit record Specifications as a scanned PDF electronic file of the marked up paper copy of Specifications.

2.3 RECORD PRODUCT DATA
   A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
      1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
      2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
      3. Note related Change Orders, record Specifications, and record Drawings where applicable.
   B. Format: Submit record Specifications as a scanned PDF electronic file and CoBIE format of the marked up paper copy of Specifications.
      1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS
   A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
   B. Format: Submit record Specifications as a scanned PDF electronic file of the marked up paper copy of Specifications.
      1. Include miscellaneous record submittals directory organized by specification section
PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one (1) copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION
SECTION 01 7900

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment
   2. Training in operation and maintenance of systems, subsystems, and equipment
B. Related Sections:
   1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections

1.3 INFORMATIONAL SUBMITTALS
A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
   1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
B. Qualification Data: For facilitator
C. Attendance Record: For each training module, submit list of participants and length of instruction time.
D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 QUALITY ASSURANCE
A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section 014000, "Quality Requirements", experienced in operation and maintenance procedures and training.
C. Pre-Instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section 013100, "Project Management and Coordination". Review methods and procedures related to demonstration and training including, but not limited to, the following:
   1. Inspect and discuss locations and other facilities required for instruction.
   2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
   3. Review required content of instruction.
   4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION
A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

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

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

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

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

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
   a. System, subsystem, and equipment descriptions
   b. Performance and design criteria if Contractor is delegated design responsibility
   c. Operating standards
   d. Regulatory requirements
   e. Equipment function
   f. Operating characteristics
   g. Limiting conditions
   h. Performance curves

2. Documentation: Review the following items in detail:
   a. Emergency manuals
   b. Operations manuals
   c. Maintenance manuals
   d. Project record documents
   e. Identification systems
   f. Warranties and bonds
   g. Maintenance service agreements and similar continuing commitments

3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages
   b. Instructions on stopping
   c. Shutdown instructions for each type of emergency
   d. Operating instructions for conditions outside of normal operating limits
   e. Sequences for electric or electronic systems
   f. Special operating instructions and procedures

4. Operations: Include the following, as applicable:
   a. Startup procedures
   b. Equipment or system break-in procedures
   c. Routine and normal operating instructions
   d. Regulation and control procedures
   e. Control sequences
   f. Safety procedures
   g. Instructions on stopping
   h. Normal shutdown instructions
   i. Operating procedures for emergencies
   j. Operating procedures for system, subsystem, or equipment failure
   k. Seasonal and weekend operating instructions
   l. Required sequences for electric or electronic systems
   m. Special operating instructions and procedures
5. Adjustments: Include the following:
   a. Alignments
   b. Checking adjustments
   c. Noise and vibration adjustments
   d. Economy and efficiency adjustments

6. Troubleshooting: Include the following:
   a. Diagnostic instructions
   b. Test and inspection procedures

7. Maintenance: Include the following:
   a. Inspection procedures
   b. Types of cleaning agents to be used and methods of cleaning
   c. List of cleaning agents and methods of cleaning detrimental to product
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance
   f. Procedures for routine maintenance
   g. Instruction on use of special tools

8. Repairs: Include the following:
   a. Diagnosis instructions
   b. Repair instructions
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions
   d. Instructions for identifying parts and components
   e. Review of spare parts needed for operation and maintenance

PART 3 - EXECUTION

3.1 PREPARATION
   A. Assemble educational materials necessary for instruction, including documentation and training modules. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section 017823, "Operations and Maintenance Data".
   B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION
   A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
   B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
      1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.
   D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
   E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS
   A. General: Engage a qualified individual to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
      1. At beginning of each training module, record each chart containing learning objective and lesson outline.
B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
   1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
   2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
   3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
   4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
      a. Name of Contractor/Installer
      b. Business address
      c. Business phone number
      d. Point of contact
      e. E-mail address
C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
   1. Film training session(s) in segments not to exceed fifteen (15) minutes.
      a. Produce segments to present a single significant piece of equipment per segment.
      b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
      c. Where a training session on a particular piece of equipment exceeds fifteen (15) minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
   1. Furnish additional portable lighting as required.
E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
G. Pre-produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
B. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY
A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

1.3 DEFINITIONS
A. BoD: Basis of Design. A document 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.
B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
C. CxA: Commissioning Authority.
D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM
A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
B. Members Appointed by Owner:
1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES
A. Provide the OPR documentation to the Design Professional, CxA and Contractor for information and use.
B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
C. Provide the BoD documentation, prepared by Design Professional and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 CONTRACTOR'S RESPONSIBILITIES
A. Contractor shall assign representatives with expertise and authority to act on its behalf and
shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Attend commissioning team meetings held on a monthly basis.
4. Integrate and coordinate commissioning process activities with construction schedule.
5. Review and accept construction checklists provided by the CxA.
6. Complete electronic construction checklists as Work is completed and provide to the CxA.
7. Review and accept commissioning process test procedures provided by the CxA.
8. Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team
B. Provide commissioning plan
C. Convene commissioning team meetings
D. Provide Project-specific construction checklists and commissioning process test procedures.
E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
F. Prepare and maintain the Issues Log
G. Prepare and maintain completed construction checklist log
H. Witness systems, assemblies, equipment, and component startup
I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 03 3543

POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes polished concrete finishing.

1. Grinding of the slab surface to receive clear reactive, penetrating liquid hardener/densifier.
2. Application of clear reactive, penetrating liquid hardener.
3. Progressively polishing and burnishing of the slab surface to achieve honed finish requirements.

B. Related Sections.

1. Concrete for polished concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, initial finishing, and curing is specified in Section 033000 "Cast-in-Place Concrete."

1.3 REFERENCES


B. American Society for Testing and Materials:

1. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
1.4 DEFINITIONS

A. Terminology: As defined by CPAA.

B. Polished Concrete: The act of changing a concrete floor surface, with or without aggregate exposure, to achieve a specified level of gloss.

C. Bonded Abrasive Polished Concrete: The multi-step operation of mechanically grinding, honing, polishing of a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of finished gloss as defined by the CPAA. This yields the most durable finish and requires the least amount of maintenance.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Data:

1. Submit manufacturer’s product data sheets on all products to be used for the work.

C. Maintenance Data: For inclusion in maintenance manual.

1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.

2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.7 QUALITY ASSURANCE

A. Polisher Qualifications:

1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, equipment, and personnel to produce specified work.

2. Supervision: Maintain competent supervisor who is at Project during times specified work is in progress, and is currently certified as Craftsman - Level I or higher by CPAA.

3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.

B. Coefficient of Friction: Achieve following coefficient of friction in accordance to the following standards:

1. ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of .42 for level floor surfaces.

2. ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of .35 for level floor surfaces.
C. Pre-Installation Meeting

1. Review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with polished concrete to attend, including the following:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Cast-in-place concrete subcontractor.
   e. Polished concrete finishing Subcontractor.

2. Review the following:
   a. Physical requirements of completed concrete slab and slab finish.
   b. Locations and time of test areas.
   c. Protection of surfaces not scheduled for finish application.
   d. Surface preparation.
   e. Application procedure.
   f. Quality control.
   g. Cleaning.
   h. Protection of finish system.
   i. Coordination with other work.
   j. Review cold- and hot-weather concreting procedures, curing procedures, construction joints, concrete repair procedures, concrete finishing, and protection of polished concrete.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original containers, with seals unbroken, bearing manufacturer labels indicating brand name and directions for storage.

B. Store concrete hardener/densifier and surface protectant treatment in environment recommended on published manufacturer’s product data sheets.

1. Store containers upright in a cool, dry, well-ventilated place, out of the sun with temperature between 40 and 100 degrees F (4 and 38 degrees C).
2. Protect from freezing.
3. Store away from all other chemicals and potential sources of contamination.
4. Keep lights, fire, sparks and heat away from containers.
5. Do not drop containers or slide across sharp objects.
6. Do not stack pallets more than three high.
7. Keep containers tightly closed when not in use.

1.9 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Environmental limitations
1. Comply with manufacturer’s written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting performance and finishing requirements.

C. The completed slab shall be protected to prevent damage by the other trades during floor completion.

D. Temperature Limitations:
   1. Do not apply when surface and air temperature are below 40 degrees F (4 degrees C) or above 95 degrees F (35 degrees C) unless otherwise indicated by manufacturer’s written instructions.
   2. Do not apply when surface and air temperatures are not expected to remain above 40 degrees F (4 degrees C) for a minimum of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.

E. Do not apply under windy conditions such that the concrete surface treatment may be blown to surfaces not intended.

F. Do not apply to frozen substrate. Allow adequate time for substrate to thaw if freezing conditions exist before application.

G. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.

H. Temporary Heat: Ambient temperature of 50 degrees F (10 degrees C) minimum.

I. Ventilation: Provide adequate ventilation in confined or enclosed areas in accordance with manufacturer’s instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pre-Densifier Concrete Cleaner: Shall remove dirt, oil, grease, and other stains from existing slab surface.

   1. Basis-of-Design Product: Subject to compliance with requirements, provide Consolideck Cleaner/Degreaser manufactured by PROSOCO, Inc. or comparable product by one of the following:

      a. L&M Construction Chemicals.
      b. W.R. Meadows

B. Penetrating Concrete Hardener/Densifier: Lithium silicate hardener/densifier shall penetrate and react with concrete to produce insoluble calcium silicate hydrate within the concrete pores. The penetrating concrete hardener shall reduce dusting, increase abrasion resistance and not contribute to surface crazing/surface Alkali Silicate Reactions (ASR).

   1. Basis-of-Design Product: Subject to compliance with requirements, provide Consolideck LS, manufactured by PROSOCO, Inc. or comparable product by one of the following:

      a. L&M Construction Chemicals
b. W.R. Meadows

2. Subject to compliance with the following requirements:
   a. Abrasion Resistance: >50% improvement over untreated samples when tested in accordance with ASTM C1353.
   b. Achieve ‘High Traction Range’ readings when tested in accordance with ANSI B101.1.
   c. Coefficient of Friction: >0.60 dry, >0.60 wet when tested in accordance with ASTM C1028.
   d. Adhesion: >10% increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D4541.
   e. Water Vapor Transmission: 100% retained when compared to untreated samples when tested in accordance with ASTM E96/96M Method B (Water Method).
   f. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.

C. Interior Concrete Protective Treatment:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Consolideck Polish Guard, manufactured by PROSOCO, Inc. or comparable product by one of the following:
      a. L&M Construction Chemicals
      b. W.R. Meadows
   2. General Purpose high-gloss film forming premium sealer shall contain lithium silicate hardener/densifier to improve the surface sheen, and surface hardness.
   3. Subject to compliance with the following requirements:
      a. Achieve ‘High Traction Range’ readings when tested in accordance with ANSI B101.1.
      b. Coefficient of Friction: >0.60 dry, >0.60 wet when tested in accordance with ASTM C1028.
      c. Adhesion: >10% increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D4541.
      d. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.

2.2 ACCESSORIES

A. Repair Material: A product that is designed to repair cracks and surface imperfections. The specified material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.
B. Grout Material: A thin mortar used for filling spaces.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Consolideck Grind-N-Fill, manufactured by PROSOCO, Inc. or comparable product by one of the following:
      a. L&M Construction Chemicals
      b. W.R. Meadows
   2. Epoxy, urethane, poluyrea, or polyaspartic resins.
   3. Latex or acrylic binders mixed with cement dust from previous grinding steps.
   4. Silicate binders mixed with cement dust from previous grinding steps.
C. Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multiply, textured membrane, not less than 18 mils in thickness.

2.3 POLISHING EQUIPMENT
A. Auto Scrubber Machine: equipment used for cleaning operations, as required to produce specified results.
B. Field Grinding and Polishing Equipment:
   1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.
   2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.
   3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.
C. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.
D. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.
E. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc) that are attached to rotating heads to refine the concrete substrate.
F. Diamond Segments General: Use heads from the same manufacturers throughout the entirety of the project.
G. Diamond Heads Types:
   1. Metal Diamonds: 60 grit / 120 grit / 150 grit.
   2. Resin Bonded, Phenolic Diamonds: 50 grit / 100 grit / 200 grit / 400 grit / 800 grit.
H. Burnishing Pads: As recommended by protective treatment manufacturer to produce specified results.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate with installer present for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Surfaces that are in question or that will affect the execution or quality of work must be brought to the attention of the Architect before work may begin.

3.2 PREPARATION

A. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration or performance of specified product from surfaces. Use appropriate concrete cleaners approved by the concrete surface treatment manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of product.

B. Repair, patch and fill cracks, voids, defects and damaged areas in surface as approved by the Architect. Allow repair materials to cure completely before application of product.

C. Variations in substrate texture and color will affect final appearance and should be corrected prior to application of sealer/hardener system and the polishing steps.

D. Protect surrounding areas prior to application. If product is accidentally misapplied to adjacent surfaces, flush with water immediately before material dries.

E. Avoid contact in areas not to be treated. Avoid contact with metal, glass and painted surfaces.

F. Seal open joints in accordance with Section 07 90 00 – Joint Sealants.

G. Apply specified sealants and caulking and allow complete curing before application of Penetrating Concrete Hardener/Densifier.

H. Do not proceed until unsatisfactory conditions have been corrected.

3.3 GENERAL REQUIREMENTS

A. Dry and wet grinding/polishing is acceptable when industry standard polishing procedures are adhered to.

B. Between and after final polishing passes, thoroughly scrub and rinse slab surface with clean water and vacuum with auto-scrubber.

C. Sequential progression of diamond polishing steps shall be required and limited to no more than double the grit value of the previous diamonds used. Process is to be performed in a minimum of eight (8) abrasive steps/grits.

D. Overlap adjacent polishing passes by 25%.

E. Perform each pass perpendicular to the other pass north/south then east/west; multiple passes may be needed.
3.4 POLISHING CONCRETE FLOORS

A. Perform all polishing procedures to ensure a consistent appearance from wall to wall.

B. Initial Grinding:
   1. Use grinding equipment with metal or semi-metal bonded tooling.
   2. Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.
   3. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.
   4. Achieve maximum refinement with each pass before proceeding to finer grit tools.
   5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
   6. Continue grinding until aggregate exposure matches approved field mock-ups.

C. Treating Surface Imperfections:
   1. Mix patching compound or grout material with dust created by grinding operations, manufacturer’s tint, or sand to match color of adjacent concrete surfaces.
   2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.
   3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.

D. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturer’s instructions.

E. Grout Grinding:
   1. Use grinding equipment and appropriate grit and bond diamond tooling.
   2. Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

F. Honing:
   1. Use grinding equipment with hybrid or resin bonded tooling.
   2. Hone concrete in one direction starting with a 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

G. Polishing:

F. Include all work necessary to achieve specified Finish Requirements.
1. Use polishing equipment with resin-bonded tooling.
2. Begin polishing in one direction starting with 800 grit tooling.
3. Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of gloss has been achieved.
4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
6. Stain Protection: Uniformly apply and remove excessive liquid according to manufacturer’s instructions. Final film thickness should be less than .05 mils after cure.
7. Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

H. Final Polished Concrete Floor Finish:

1. Aggregate Exposure Class A – Cream Finish: Polish Portland cement paste resulting in little or no aggregate exposure.
2. Finished Gloss Level 2 – Satin:
   a. Procedure: Recommended not less than 4 step process with full refinement of each diamond tool with one application of densifier.
   b. Gloss Measurement: Determine the specular gloss by incorporating the following:

      1) Reflective Clarity Reading: Not less than 35 according to ASTM D5767 prior to the application of sealers.

3.5 FIELD QUALITY CONTROL

A. Field Testing: The Owner may engage a qualified walkway auditor to perform field testing to determine if polished concrete floor finish complies with specified coefficient of friction;

   1. ANSI B101.1 for static coefficient of friction
   2. ANSI B101.3 for dynamic coefficient of friction

3.6 SLAB PROTECTION

A. Protect finished floors to prevent damage including staining, gouges and scratching by construction traffic and activities until possession.

B. Do not drag or drop equipment or material across the slab which will scratch or chip it.

C. Tires shall be inspected for debris prior to use on slab. Remove embedded items which may cause damage to floor slab.

D. Clean up spills on slab immediately. Provide cleaning chemicals and absorptive materials.

END OF SECTION
SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
   a. Swinging doors.
   b. Sliding doors.
   c. Gates.

2. Electronic access control system components, including:
   a. Biometric access control reader.
   b. Electronic access control devices.

3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
4. Lead-lining door hardware items required for radiation protection at door openings.
5. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier’s responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:
1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
4. Division 13 Section "Radiation Protection" for requirements for lead-lining for door hardware at openings indicated to receive radiation protection.
5. Division 26 sections for connections to electrical power system and for low-voltage wiring.
6. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
   4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute
   1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:
   1. Submit in accordance with Conditions of Contract and Division 01 requirements.
   2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
   3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:
   1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
   2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
      a. Wiring Diagrams: For power, signal, and control wiring and including:
1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Quantity, type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.
   k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
   1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:
   a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
   1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.

2. Product data for electrified door hardware:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

3. Certificates of Compliance:
   a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
   b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in “QUALITY ASSURANCE” article, herein.
   c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in “QUALITY ASSURANCE” article, herein.

4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Factory order acknowledgement numbers (for warranty and service)
   d. Name, address, and phone number of local representative for each manufacturer.
   e. Parts list for each product.
   f. Final approved hardware schedule, edited to reflect conditions as-installed.
   g. Final keying schedule
   h. Copies of floor plans with keying nomenclature
   i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
   j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
1.05 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
   a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

G. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
   a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.
d. Requirements for access control.
e. Address for delivery of keys.

H. Pre-installation Conference
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Inspect and discuss preparatory work performed by other trades.
   3. Inspect and discuss electrical roughing-in for electrified door hardware.
   4. Review sequence of operation for each type of electrified door hardware.
   5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:
   1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
   2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
   1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:
   1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
   2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
   1. Promptly replace products damaged during shipping.
   2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
   3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys to Owner by registered mail or overnight package service.
1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner’s security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
   a. Closers:
      1) Mechanical: LCN 4000 series, 30 years
      2) Electrified: 2 years.
   b. Automatic Operators: LCN, 2 years
   c. Exit Devices:
      1) Mechanical: 3 years.
      2) Electrified: 1 year.
   d. Locksets:
      1) Mechanical: Schlage ND series, 10 years
      2) Electrified: 1 year.
   e. Continuous Hinges: Lifetime warranty.
   f. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.09 MAINTENANCE

A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
2.01 MANUFACTURERS

A. NO SUB: The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: “No Substitute.”

1. Where “No Substitute” is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect’s approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.
C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
   1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

D. Cable and Connectors: Hardwired Electronic Access Control Lockset and Exit Device Trim:
   1. Data: 24AWG, 4 conductor shielded, Belden 9843, 9841 or comparable.
   2. DC Power: 18 AWG, 2 conductor, Belden 8760 or comparable.
   3. Provide type of data and DC power cabling required by access control device manufacturer for this installation.
   4. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with sufficient number and wire gauge with standardized Molex plug connectors to accommodate electric function of specified hardware. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

B. Requirements:
   1. Provide hinges conforming to ANSI/BHMA A156.1.
   2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
      a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
      b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
   3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
      a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   4. 2 inches or thicker doors:
      a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
      b. Interior: Heavy weight, steel, 5 inches (127 mm) high
   5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
   6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
   7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
      a. Steel Hinges: Steel pins
      b. Non-Ferrous Hinges: Stainless steel pins
      c. Out-Swinging Exterior Doors: Non-removable pins
d. Out-Swinging Interior Lockable Doors: Non-removable pins  
e. Interior Non-lockable Doors: Non-rising pins

8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.

10. Provide mortar guard for each electrified hinge specified.

11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 CONTINUOUS HINGES

A. Stainless Steel

1. Manufacturers:
   a. Scheduled Manufacturer: McKinney

2. Requirements:
   a. Provide pin and barrel continuous hinges conforming to ANSI/BHMA A156.26., Grade 1.
   b. Provide pin and barrel continuous hinges fabricated from 14 gauge, type 304 stainless steel.
   c. Provide twin self-lubricated nylon bearings at each hinge knuckle, with 0.25-inch (6 mm) diameter stainless steel pin.
   d. Provide hinges capable of supporting door weights up to 600 pounds, and successfully tested for 1,500,000 cycles.
   e. On fire-rated doors, provide pin and barrel continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
   f. Provide pin and barrel continuous hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
   g. Install hinges with fasteners supplied by manufacturer.
   h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

B. Cold-Rolled Steel

1. Manufacturers:
   a. Scheduled Manufacturer: Ives.

2. Requirements:
   a. Provide pin and barrel continuous hinges conforming to ANSI/BHMA A156.26., Grade 1.
b. Provide pin and barrel continuous hinges fabricated from type 1012 cold rolled steel.
c. Provide twin self-lubricated nylon bearings at each hinge knuckle, with 0.25-inch (6 mm) diameter stainless steel pin.
d. Provide hinges capable of supporting door weights up to 600 pounds, and successfully tested for 1,500,000 cycles.
e. On fire-rated doors, provide pin and barrel continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Provide pin and barrel continuous hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
g. Install hinges with fasteners supplied by manufacturer.
h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

C. Aluminum Geared

1. Manufacturers:
   a. Scheduled Manufacturer: Ives.

2. Requirements:
   a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
   b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
   c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
   d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
   e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
   f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
   g. Install hinges with fasteners supplied by manufacturer.
   h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:
   a. Scheduled Manufacturer: Von Duprin EPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.
C. Locate electric power transfer per manufacturer’s template and UL requirements, unless interference with operation of door or other hardware items.

2.06 PIVOT SETS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
   2. Where offset pivots are specified, provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
   3. Provide appropriate model where pivot sets are scheduled at fire rated openings.
   4. Provide lead-lined model where pivot sets are specified at lead-lined doors.
   5. Provide pivots with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer then provide recommended power transfer device and appropriate quantity of pivots.
   6. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.07 EMERGENCY HARDWARE

A. Double Lipped Strike
   1. Manufacturers:
      a. Scheduled Manufacturer: Ives.
   2. Provide double lip strike offset-hung to allow door to swing open in opposite direction unless detailed otherwise. Size for specific frame depth. Coordinate special latchbolt-hole location and special template, as required, to operate with mortise lock being used as specified.
   3. Provide compatible emergency stop/release as recommended by manufacturer of double lip strike or engineered to operate with double lip strike.

B. Emergency Stop/Release
   1. Manufacturers:
      a. Scheduled Manufacturer: Ives.
2. Provide emergency stop/release for doors with double lip strikes offset-hung to allow door to swing open in opposite direction unless detailed otherwise.

2.08 FLUSH BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.09 SURFACE BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Surface bolts to have 1” throw for maximum security with concealed mounting that prevents vandalism. Units to be constructed of heavy duty steel and cUL listed up to three (3) hours when used on the inactive door of a pair up to 8’ in height.

2.10 COORDINATORS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
   2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.
2.11 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: BEST.

B. Requirements:
   1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
   2. Cylinders: Refer to “KEYING” article, herein.
   3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
   4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
   5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
   6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   7. Provide electrified options as scheduled in the hardware sets.
   8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
      a. Lever Design: Schlage RHO.
      b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.12 EXIT DEVICES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Von Duprin 98/35A Series – No Substitutions

B. Requirements:
   1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
   2. Cylinders: Refer to “KEYING” article, herein.
   3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
   4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
   5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
   6. Provide flush end caps for exit devices.
   7. Provide exit devices with manufacturer’s approved strikes.
   8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
   9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
   10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.

12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.

13. Provide electrified options as scheduled.

14. QM 98/99 Rim Exit Devices: provide devices with damper controlled re-latching to reduce operational noise. Where lever trim is specified, provide damper controlled lever return.

15. Top latch mounting: double or single tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.

16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
   a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.13 ELECTRIC STRIKES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Von Duprin 6000 Series.

B. Requirements:
   1. Provide electric strikes designed for use with type of locks shown at each opening.
   2. Provide electric strikes UL Listed as burglary-resistant.
   3. Where required, provide electric strikes UL Listed for fire doors and frames.
   4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.14 PASSIVE INFRARED MOTION SENSORS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Schlage SCAN II Series.

B. Requirements:
   1. Provide motion sensors as specified in hardware groups.

2.15 POWER SUPPLIES

A. Manufacturers and Products:
B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.
   i. Tested and certified to meet UL294.
   j. NEMA 1 enclosure.
   k. Hinged cover w/lock down screws.
   l. High voltage protective cover.

2.16 CYLINDERS: MATCH OWNERS KEY SYSTEM

A. Manufacturers:

   1. Scheduled Manufacturer: BEST SFIC core – No Substitutions

B. Requirements:

   1. Provide permanent interchangeable cylinders/cores to match Owner’s existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.

C. Construction Keying:

   1. Temporary Construction Cylinder Keying.
      a. Provide construction cores that permit voiding construction keys without cylinder removal, furnished in accordance with the following requirements.
         1) Split Key or Lost Ball Construction Keying System.
         2) 3 construction control keys, and extractor tools or keys as required to void construction keying.
         3) 12 construction change (day) keys.
      b. Owner or Owner’s Representative will void operation of temporary construction keys.

   2. Replaceable Construction Cores.
      a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
         1) 3 construction control keys
2) 12 construction change (day) keys.
   b. Owner or Owner’s Representative will replace temporary construction cores with permanent cores.

2.17 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. For factory registered existing system: Provide cylinders/cores keyed into Owner’s existing factory registered keying system.

C. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

D. For non-factory existing system: Provide cylinders/cores keyed into Owner’s existing keying system managed by Owner’s locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact:
   1. Firm Name:
   2. Contact Person:
   3. Telephone:

E. Requirements:
   1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
      a. Master Keying system as directed by the Owner.
      b. No Master Keying: Cylinders/cores only operated by change (day) keys.
   2. Forward bitting list and keys separately from cylinders, by means as directed by Owner.
      Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
   3. Provide keys with the following features:
      a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
      b. Patent Protection: Keys and blanks protected by one or more utility patent(s).
   4. Identification:
      a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication “Keying Systems and Nomenclature” for identification. Do not provide blind code marks with actual key cuts.
      b. Identification stamping provisions must be approved by the Architect and Owner.
      c. Stamp cylinders/cores and keys with Owner’s unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with “DO NOT DUPLICATE” along with the “PATENTED” or patent number to enforce the patent protection.
      d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
2.18 KEY CONTROL SYSTEM

A. Manufacturers:
   1. Scheduled Manufacturer: Telkee.

B. Requirements:
   1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
      a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
      b. Provide hinged-panel type cabinet for wall mounting.

2.19 KEY MANAGEMENT SOFTWARE

A. Manufacturers and Products:
   2. Acceptable Manufacturers and Products: Best Keystone 600N, Corbin-Russwin KeyWizard, Medeco KeyWizard, Sargent KeyWizard, Yale KeyWizard.

B. Requirements:
   1. Software: Provide tracking, issuing, collecting and transferring information regarding keys. Provide customized query, reporting, searching capability, comprehensive location hardware listings, display key holder photos and signature for verification, and provide automatic reminders for maintenance, back-ups and overdue keys.
   2. Provide training for Owner's personnel on proper operation and application of key management software.

2.20 DOOR CLOSERS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: LCN 4040XP series – No Substitutions

B. Requirements:
1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 3/4 inch (19 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.

7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.21 PROTECTION PLATES

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
   2. Sizes of plates:
      a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
      b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
      c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.22 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturers: Glynn-Johnson.

B. Requirements:
1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.23 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.24 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:


B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
   a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
   b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
2.25 SILENCERS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide "push-in" type silencers for hollow metal or wood frames.
   2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
   3. Omit where gasketing is specified.

2.26 MAGNETIC HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturer: LCN.

B. Requirements:
   1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.27 DOOR POSITION SWITCHES

A. Manufacturers:
   1. Scheduled Manufacturer: Schlage.

B. Requirements:
   1. Provide recessed or surface mounted type door position switches as specified.
   2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.28 FINISHES

A. Finish: BHMA 626/652 (US26D); except:
   1. Hinges at Exterior Doors: BHMA 630 (US32D)
   2. Continuous Hinges: BHMA 630 (US32D)
   3. Continuous Hinges: BHMA 628 (US28)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)
10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

B. Finish: BHMA 625/651 (US26); except:
   1. Hinges at Exterior Doors: BHMA 629 (US32)
   2. Continuous Hinges: BHMA 630 (US32D)
   3. Continuous Hinges: BHMA 628 (US28)
   5. Protection Plates: BHMA 629 (US32)
   6. Overhead Stops and Holders: BHMA 629 (US32)
   7. Door Closers: Powder Coat to Match
   8. Wall Stops: BHMA 629 (US32)
   9. Latch Protectors: BHMA 630 (US32D)
   10. Weatherstripping: Clear Anodized Aluminum
   11. Thresholds: Mill Finish Aluminum

C. Finish: BHMA 612/639 (US10); except:
   1. Continuous Hinges: BHMA 630 (US32D)
   2. Continuous Hinges: BHMA 630 (US32D)
   3. Door Closers: Powder Coat to Match
   4. Latch Protectors: BHMA 630 (US32D)
   5. Weatherstripping: Dark Bronze Anodized Aluminum
   6. Thresholds: Extruded Architectural Bronze – Mill Finish

D. Finish: BHMA 613/640 (US10B); except:
   2. Continuous Hinges: BHMA 710 (US10B)
   5. Weatherstripping: Dark Bronze Anodized Aluminum.
   6. Thresholds: Extruded Architectural Bronze, Oil-Rubbed

E. Finish: BHMA 605/632 (US3); except:
   1. Continuous Hinges: BHMA 630 (US32D)
   2. Door Closers: Powder Coat to Match
   3. Latch Protectors: BHMA 630 (US32D)
   5. Thresholds: Extruded Architectural Bronze, Polished

F. Finish: BHMA 606/633 (US4); except:
   1. Continuous Hinges: BHMA 630 (US32D)
   2. Continuous Hinges: BHMA 688 (US4)
   3. Door Closers: Powder Coat to Match
   4. Latch Protectors: BHMA 630 (US32D)
5. Weatherstripping: Gold Anodized Aluminum
6. Thresholds: Extruded Architectural Bronze – Mill Finish

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

2. Custom Steel Doors and Frames: HMMA 831.

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
H. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

I. Lock Cylinders: Install construction cores to secure building and areas during construction period.
   1. Replace construction cores with permanent cores as indicated in keying section.
   2. Furnish permanent cores to Owner for installation.

J. Lead Protection: Lead wrap hardware penetrating lead-lined doors. Levers and roses to be lead lined. Apply kick and armor plates on lead-lined doors with adhesive as recommended by manufacturer.

K. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
   1. Conduit, junction boxes and wire pulls.
   2. Connections to and from power supplies to electrified hardware.
   3. Connections to fire/smoke alarm system and smoke evacuation system.
   4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
   5. Testing and labeling wires with Architect's opening number.

L. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

M. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

N. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

T. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
3.03 FIELD QUALITY CONTROL

A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.

1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.04 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
### Hardware Group No. 501T

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<th>QTY</th>
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<th>CATALOG NUMBER</th>
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<td>MCK</td>
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<td>9K3-7R-14D (CLASSROOM FUNCTION)</td>
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<td>PERMANENT CORE</td>
<td>IC7 CONFIRM KEYING WITH OWNER</td>
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<td>SURFACE CLOSER</td>
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<td>WALL STOP</td>
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<td>GASKETING</td>
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### Hardware Group No. 501TW

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### Hardware Group No. 701RT

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END OF SECTION
University of North Texas - Chemistry Building
Chemistry 3rd Floor  Welch Chair Laboratory Renovation

ISSUED FOR CONSTRUCTION
December 18, 2020

INDEX OF DRAWINGS

SITE LOGISTICS MAP

PROJECT LOCATION
Chemistry Building
1508 W Mulberry St, Denton, TX 76201

DESIGN STANDARDS


VICINITY MAP
1. Remove existing metal stud/gypsum air. 2. Remove existing door, frame and hardware.
3. Notify architect of any unprotected openings or penetrations in rated perimeter wall. 4. Prepare existing surfaces indicated to remain. 5. Field verify existing conditions prior to commencement of demolition. 6. Remove existing fire alarm devices. 7. Where wall is scheduled to be removed, disconnect and remove electrical devices. 8. Where wall is scheduled to be removed, remove branch circuit and wiring back to nearest junction box. 9. Maintain electrical service to areas in its entirety, remove fire alarm devices. 10. Remove existing push to stop button, return to nearest circuit breaker as spare. 11. Remove existing wall to remain. 12. Remove in-wall blocking for perimeter openings or penetrations in rated wall to remain.

NOTE: Not all references will appear on this sheet.
1. Connect new 1" LA to existing compressed air service above ceiling.
2. 1 1/2" DCW and DHW, 1" DIS and DIR down in pipe chase to lab sink and DI faucet. 2" LW down with 2" vent.
3. 1 1/2" DCW and LA down to fume hoods. 2" LW down with 2" LV up above ceiling.
4. 1" DCW and DHW to ASSE 1071 compliant thermostatic mixing valve above ceiling for emergency shower. Route 1 1/4" tempered water line down to fixture water connection.
5. 1 1/2" DCW down to fume hoods. 2" LW down with 2" LV up above ceiling.
6. 2" sanitary vent from below. Rework vents on floor below to connect to existing sanitary waste piping.
7. 1 1/2" DCW and DHW down to lab sink. 2" lab waste down with 2" lab vent. 1" DIS loop down in wall behind sink. Rough-in and connect 1/2" DIS to polisher and sink DI faucet. Provide emergency eyewash thermostatic mixing valve below sink counter and route tepid water line supply to deck mounted eyewash.

KEYED NOTES - P-301

- Rework existing sprinkler system to provide ordinary hazard group 2 coverage for a fully NFPA 13 compliant system.
- Provide connection from fire sprinkler system to sprinkler head inside gas cabinet.
- Connect the relocated 2" sanitary vent to existing vent piping. Reconnect vent to floor drain.
- Rework existing floor drain to be flush with finish floor level. Patch concrete as needed and refer to renovated finish floor plans to match.