
PROJECT MANUAL

for:

**UNCC-SGO RENOVATIONS
STUDENT GOVERNMENT OFFICE, STE 200
UNC CHARLOTTE – POPP MARTIN STUDENT UNION
9201 UNIVERSITY CITY BOULEVARD
CHARLOTTE, NORTH CAROLINA 28223
CONTRACT DOCUMENTS
113-10010-00
SCO #18-18336-01A
MARCH 23, 2020**

SECTION 00 01 01 – PROJECT TITLE PAGE

PROJECT MANUAL
INCLUDING SPECIFICATIONS
FOR CONSTRUCTION OF

UNCC-SGO RENOVATIONS
STUDENT GOVERNMENT OFFICE, STE 200
UNC CHARLOTTE – POPP MARTIN STUDENT UNION
9201 UNIVERSITY CITY BOULEVARD
CHARLOTTE, NORTH CAROLINA 28223

PREPARED BY:

LITTLE DIVERSIFIED ARCHITECTURAL CONSULTING, INC.
615 SOUTH COLLEGE STREET, SUITE 1600
CHARLOTTE, NORTH CAROLINA 28202
704-525-6350

ARCHITECT'S JOB NUMBER
113-10010-00
SCO #18-18336-01A

ISSUE DATE
MARCH 23, 2020

END OF SECTION 00 01 01

PROJECT TITLE PAGE

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SECTION 00 01 06 – PROJECT DIRECTORY

PROJECT: UNCC-SGO Renovations
Student Government Office, STE 200
UNC Charlotte – Popp Martin Student Union
9201 University City Boulevard
Charlotte, North Carolina 28223

CLIENT: University of North Carolina at Charlotte
9201 University City Boulevard
Charlotte, North Carolina 28223

ARCHITECT: Little Diversified Architectural Consulting
615 South College Street, Suite 1600
Charlotte, North Carolina 28202
Shannon Rydell
Phone: (704) 525-6350
Email: shannon.rydell@littleonline.com

FIRE PROTECTION: McCracken & Lopez, P.A.
8801 J.M. Keynes Drive, Suite 240
Charlotte, North Carolina 28262
James L. Currie
Phone: (704) 376-7072
Email: jamesc@mccrackenlopez.com

PLUMBING: McCracken & Lopez, P.A.
8801 J.M. Keynes Drive, Suite 240
Charlotte, North Carolina 28262
James L. Currie
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MECHANICAL: McCracken & Lopez, P.A.
8801 J.M. Keynes Drive, Suite 240
Charlotte, North Carolina 28262
James L. Currie
Phone: (704) 376-7072
Email: jamesc@mccrackenlopez.com

ELECTRICAL: McCracken & Lopez, P.A.
8801 J.M. Keynes Drive, Suite 240
Charlotte, North Carolina 28262
Gail Craig
Phone: (704) 376-7072
Email: gailc@mccrackenlopez.com

END OF SECTION 00 01 06

February 07, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

SECTION 00 01 07 - SEALS PAGE

This section includes the Professional Seals by Design Professionals and others responsible for preparing the Construction Documents.

ARCHITECTURAL:

SEAL LOCATION:

NAME:

SHANNON RYDELL

(print)

Shannon Rydell

(signature)

NC #12539

(professional number)



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DIVERSIFIED ARCHITECTURAL CONSULTING

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

PLUMBING/
HVAC and
FIRE PROTECTION:

SEAL LOCATION:

NAME:

James L. Currie, PE, LEED AP

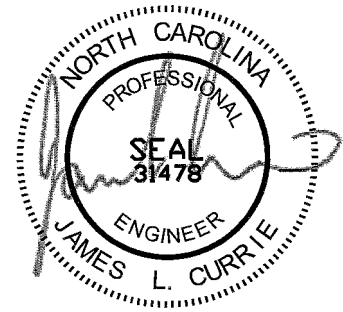
(print)



(signature)

31478

(professional number)



March 23, 2020

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DIVERSIFIED ARCHITECTURAL CONSULTING

ELECTRICAL:

SEAL LOCATION:

NAME:

Gail Craig, PE, LEED AP

(print)



(signature)

18459

(professional number)



March 23, 2020

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DIVERSIFIED ARCHITECTURAL CONSULTING

UNCC-SGO RENOVATIONS
 STUDENT GOVERNMENT OFFICE, STE 200
 UNC CHARLOTTE – POPP MARTIN STUDENT UNION
 9201 UNIVERSITY CITY BOULEVARD
 CHARLOTTE, NORTH CAROLINA 28223
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END OF SECTION 00 01 10

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The following drawings are issued as a part of the Contract Documents and are incorporated into this Project Manual by reference:

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CS	COVERSHEET
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G001	GENERAL INFORMATION AND SHEET INDEX
G002	BUILDING CODE SUMMARY
G111	LIFE SAFETY PLAN – LEVEL 01
ARCHITECTURAL	
AD111	DEMOLITION FLOOR PLAN AND REFLECTED CEILING PLAN
A111	PARTITION TYPES AND FLOOR PLAN – LEVEL 02
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FIRE PROTECTION	
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FP101	LEVEL 2 FLOOR PLAN – FIRE PROTECTION – DEMOLITION AND NEW WORK

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

ELECTRICAL

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END OF SECTION 00 01 15

NOTICE TO BIDDERS

Sealed proposals will be received by The University of North Carolina at Charlotte, at 9201 University Boulevard, Charlotte, NC 28223, until **1:30 p.m. on Tuesday, April 21, 2020.**

NOTE: BID SUBMITTAL PROCEDURES DURING COVID-19 CRISIS

All hand delivered bids shall be dropped in the white Drop Box located next to the Motor Fleet parking spaces (<https://goo.gl/maps/KGphwNRyaFCBFxtj8>) in Lot 25 (second left entrance on Poplar Lane) in front of the Facilities Operations & Parking Services building (#92 on the campus map – <http://facilities.uncc.edu/maps>).

Bidders may also submit bids via USPS/UPS/FEDEX sent to the attention of Joyce Clay, Facilities Operations & Parking Services building no. 92, 9643 Poplar Lane, Charlotte, NC 28223. It is the bidder's responsibility to ensure that the bid arrives before the bid closing time of 1:30 PM. Bidders shall sign across the sealed flap on the envelope to ensure no tampering prior to the bid opening.

Bidders who are interested in observing the bid opening via video conference shall also provide an email address on the envelope. Project Manager will then send an invitation with hyperlink via email to the video conference to all bidders who have provided an email address. Access to the video conference will begin at 2:00 PM and it is the responsibility of the bidder to access the video conference. In-person attendance at bid opening will be limited to one Contractor firm representatives and two UNC Charlotte Facilities representatives.

Bids will be publicly opened and read at 2:00 p.m. in Room 123A of the Facilities Management & Parking Services building no. 92 located at 9643 Poplar Lane, Charlotte, NC 28223 for the furnishing of labor, material and equipment entering into the construction of:

Student Government Office Renovations The University of North Carolina at Charlotte SCO Project Number 18-18336-01A

An interior renovation of approximately 9,400 sf space at the Student Union Building of the University of North Carolina at Charlotte campus. The Work includes demolition, new ceilings, flooring, light fixtures, partitions, and MEP.

Bids will be received for Single Prime Contract only. All proposals shall be lump sum.

Pre-Bid Meeting during COVID-19 Crisis

A non-mandatory Pre-bid meeting will be held for all interested bidders on Wednesday, April 1, at 2:00 p.m. via a Lifesize video conference hosted by Little Diversified Architectural Consulting, Inc. The meeting will address project specific questions, issues, bidding procedures, and bid forms. Unfortunately, we will not be able to perform a site visit. Should teams need any information, we can supply images.

If you intend to attend the pre-bid, please email Crystal Howard, Little Diversified Architectural Consulting, crystal.howard@littleonline.com. Office phone (704) 561-3453 or

Mobile phone (704) 562-6323, by 5:00 p.m. Tuesday, March 31, 2020 with the following information -

Contact name:
Name of company:
Telephone number:
Email address:

We will send out an invitation with the link to join the a Lifesize virtual pre-bid meeting by 10:00 a.m. Wednesday, April 1, 2020 for the pre-bid meeting scheduled for 2:00 p.m.

Pre-bid meeting will be recorded and available to the public immediately after the event. A link will be posted to the Facilities Management website – <http://facilities.uncc.edu/advertisements>.

The meeting is also to identify preferred brand alternates and their performance standards that the owner will consider for approval on this project.

In accordance with General Statute GS133-3, specifications may list one or more preferred brands as an alternate to the base bid in limited circumstances. Specifications containing a preferred brand alternate under this section must identify the performance standards that support the preference. Performance standards for the preference must be approved in advance by the owner in an open meeting. Any alternate approved by the owner shall be approved where (i) the preferred alternate will provide cost savings, maintain or improve the functioning of any process or system affected by the preferred item or items, or both, and (ii) a justification identifying these criteria is made available in writing to the public.

In accordance with GS133-3 and SCO procedures the following preferred brand items are being considered as Alternates by the owner for this project:

- A. **Alternate No. 4:** Owner preferred alternate: Provide owner preferred campus standard hardware alternate as specified in Section 08 71 00 “Door Hardware” and as follows:
1. Locks and Cylinders: Schlage.
 2. Exit Devices: Von Duprin.
 3. Door Closers: LCN.

Justification of any approvals will be made available to the public in writing no later than seven (7) days prior to bid date.

Bidders’ questions will be entertained in writing until 5:00 pm on Wednesday, April 8, 2020. Address all questions to the designer, Little Diversified Architectural Consulting, Inc. – Shannon Rydell – shannon.rydell@littleonline.com.

Final addendum will be issued Tuesday, April 14, 2020.

Complete plans, specifications and contract documents will be open for inspection in the offices:

1. Designer: Little Diversified Architectural Consulting, Inc., 615 S. College Street, Suite 1600, Charlotte, North Carolina 28202, Phone: (704) 525-6350

2. Owner: UNC Charlotte, Facilities Management/Police Building, 2nd floor – Capital Projects, 9151 Cameron Blvd., Charlotte, NC 28223, Phone: (704) 687-0615.
3. Or may be obtained at the offices of Little Diversified Architectural Consulting, 615 South College Street, Suite 1600, Charlotte, North Carolina 28202, Phone: (704) 525-6350; Attention: Crystal Howard, upon deposit of One Hundred dollars (\$100.00) in cash or certified check. The full plan deposit will be returned to those bidders provided all documents are returned in good, usable condition within ten (10) days after the bid date.

Electronic plans, specifications and contract documents are available at the following:

1. Construct Connect at content@constructconnect.com, (800) 364-2059; representing Associated General Contractors (AGC) Carolinas Branch, Eastern Regional Office of Reed Construction Data in Norcross, GA, and Hispanic Contractors Association of the Carolinas (HCAC).
2. North Carolina Offices of Dodge Data & Analytics (formerly McGraw-Hill Construction) – Customer Service – <http://dodgeprojects.construction.com>, (800) 393-6343
3. Metrolina Minority Contractors Association (MMCA) – mmca@mmcaofcharlotte.org, (877) 526-6205

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit A* or *Affidavit B* as applicable. Forms and instructions are included within the Proposal Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.)

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting bids on this project must have license classification for Unlimited General Contractor (set forth the license classification required by the NC General Contractors Licensing Board under G.S.87.1).

NOTE--SINGLE PRIME CONTRACTS: Under GS 87-1, a contractor that superintends or manages construction of any building, highway, public utility, grading, structure or improvement shall be deemed a “general contractor” and shall be so licensed. Therefore, a single prime project that involves other trades will require the single prime contractor to hold a proper General Contractors license.

EXCEPT: On public buildings being bid single prime, where the total value of the general construction does not exceed 25% of the total construction value, contractors under GS87- Arts 2 and 4 (Plumbing, Mechanical & Electrical) may bid and contract directly with the Owner as the SINGLE PRIME CONTRACTOR and may subcontract to other properly licensed trades. GS87-1.1- Rules .0210

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company, insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal, or in lieu thereof a bidder may offer a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North
SCO – Notice to Bidders 2010 (Updated Dec. 2010)

Carolina to execute the contract in accordance with the bid bond. Said deposit shall be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

A performance bond and a payment bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 30 60 days.

The owner reserves the right to reject any or all bids and to waive informalities.

Please note that any bid delivered to UNC Charlotte Facilities Management – Facilities Operations must be received no later than 1:30 p.m. on bid day at the location noted below.

Mailed Proposals:

Attn: Ms. Joyce Clay – Facilities Operations
The University of North Carolina at Charlotte
Facilities Management – Facilities Operations
9201 University City Boulevard
Charlotte, NC 28223-0001

Or

Hand Delivered: SEE BID SUBMITTAL PROCEDURES DURING COVID-19 CRISIS on page 1.

Envelope should be marked “sealed bid included” and addressed as follows:

Attn: Ms. Joyce Clay – Facilities Operations
Facilities Operations & Parking Services building
9643 Poplar Lane
Charlotte, NC 28223

NOTE BID OPENING: Not more than one (1) representative per company will be allowed to attend.

Designer:

Little Diversified Architectural Consulting, Inc.
615 S. College Street, Suite 1600
Charlotte, North Carolina 28202
(704) 525-6350

Owner:

UNC Charlotte
9201 University City Boulevard
Charlotte, NC 28223-0001
(704) 687-0615

GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES FOR PARTICIPATION IN STATE CONSTRUCTION CONTRACTS

In accordance with G.S. 143-128.2 (effective January 1, 2002) these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, and alternative contracting methods, on State construction projects in the amount of \$300,000 or more. The legislation provides that the State shall have a verifiable ten percent (10%) goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These requirements are published to accomplish that end.

SECTION A: INTENT

It is the intent of these guidelines that the State of North Carolina, as awarding authority for construction projects, and the contractors and subcontractors performing the construction contracts awarded shall cooperate and in good faith do all things legal, proper and reasonable to achieve the statutory goal of ten percent (10%) for participation by minority businesses in each construction project as mandated by GS 143-128.2. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not submit the lowest responsible, responsive bid or bids.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
 - a. Black, that is, a person having origins in any of the black racial groups in Africa;
 - b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
 - c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
 - d. American Indian, that is, a person having origins in any of the original peoples of North America; or
 - e. Female
2. Minority Business - means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
 - b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.
3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637. "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged".
4. Public Entity - means State and all public subdivisions and local governmental units.
5. Owner - The State of North Carolina, through the Agency/Institution named in the contract.
6. Designer - Any person, firm, partnership, or corporation, which has contracted with the State of North Carolina to perform architectural or engineering, work.
7. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

8. Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment, materials or services, including construction, and obligating the buyer to pay for them.
9. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the State of North Carolina to perform construction work or repair.
10. Subcontractor - A firm under contract with the prime contractor or construction manager at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

SECTION C: RESPONSIBILITIES

1. Office for Historically Underutilized Businesses, Department of Administration (hereinafter referred to as HUB Office).

The HUB Office has established a program, which allows interested persons or businesses qualifying as a minority business under G.S. 143-128.2, to obtain certification in the State of North Carolina procurement system. The information provided by the minority businesses will be used by the HUB Office to:

- a. Identify those areas of work for which there are minority businesses, as requested.
- b. Make available to interested parties a list of prospective minority business contractors and subcontractors.
- c. Assist in the determination of technical assistance needed by minority business contractors.

In addition to being responsible for the certification/verification of minority businesses that want to participate in the State construction program, the HUB Office will:

- (1) Maintain a current list of minority businesses. The list shall include the areas of work in which each minority business is interested.
- (2) Inform minority businesses on how to identify and obtain contracting and subcontracting opportunities through the State Construction Office and other public entities.
- (3) Inform minority businesses of the contracting and subcontracting process for public construction building projects.
- (4) Work with the North Carolina trade and professional organizations to improve the ability of minority businesses to compete in the State construction projects.
- (5) The HUB Office also oversees the minority business program by:
 - a. Monitoring compliance with the program requirements.
 - b. Assisting in the implementation of training and technical assistance programs.
 - c. Identifying and implementing outreach efforts to increase the utilization of minority businesses.
 - d. Reporting the results of minority business utilization to the Secretary of the Department of Administration, the Governor, and the General Assembly.

2. State Construction Office

The State Construction Office will be responsible for the following:

- a. Furnish to the HUB Office a minimum of twenty-one days prior to the bid opening the following:
 - (1) Project description and location;
 - (2) Locations where bidding documents may be reviewed;
 - (3) Name of a representative of the owner who can be contacted during the advertising period to advise who the prospective bidders are;
 - (4) Date, time and location of the bid opening.
 - (5) Date, time and location of prebid conference, if scheduled.
- b. Attending scheduled prebid conference, if necessary, to clarify requirements of the general statutes regarding minority-business participation, including the bidders' responsibilities.

- c. Reviewing the apparent low bidders' statutory compliance with the requirements listed in the proposal, that must be complied with, if the bid is to be considered as responsive, prior to award of contracts. The State reserves the right to reject any or all bids and to waive informalities.
- d. Reviewing of minority business requirements at Preconstruction conference.
- e. Monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
- f. Provide statistical data and required reports to the HUB Office.
- g. Resolve any protest and disputes arising after implementation of the plan, in conjunction with the HUB Office.

3. Owner

Before awarding a contract, owner shall do the following:

- a. Develop and implement a minority business participation outreach plan to identify minority businesses that can perform public building projects and to implement outreach efforts to encourage minority business participation in these projects to include education, recruitment, and interaction between minority businesses and non-minority businesses.
- b. Attend the scheduled prebid conference.
- c. At least 10 days prior to the scheduled day of bid opening, notify minority businesses that have requested notices from the public entity for public construction or repair work and minority businesses that otherwise indicated to the Office for Historically Underutilized Businesses an interest in the type of work being bid or the potential contracting opportunities listed in the proposal. The notification shall include the following:
 - 1. A description of the work for which the bid is being solicited.
 - 2. The date, time, and location where bids are to be submitted.
 - 3. The name of the individual within the owner's organization who will be available to answer questions about the project.
 - 4. Where bid documents may be reviewed.
 - 5. Any special requirements that may exist.
- d. Utilize other media, as appropriate, likely to inform potential minority businesses of the bid being sought.
- e. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- f. Review, jointly with the designer, all requirements of G.S. 143-128.2(c) and G.S. 143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award to the State Construction Office.
- g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award to State Construction Office.
- h. Review prime contractors' pay applications for compliance with minority business utilization commitments prior to payment.
- i. Make documentation showing evidence of implementation of Owner's responsibilities available for review by State Construction Office and HUB Office, upon request

4. Designer

Under the single-prime bidding, separate prime bidding, construction manager at risk, or alternative contracting method, the designer will:

- a. Attend the scheduled prebid conference to explain minority business requirements to the prospective bidders.
- b. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.
- c. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- d. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with

corresponding total dollar value of the bid and affidavit listing Good Faith Efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

- e. During construction phase of the project, review “MBE Documentation for Contract Payment” – (Appendix E) for compliance with minority business utilization commitments. Submit Appendix E form with monthly pay applications to the owner and forward copies to the State Construction Office.
- f. Make documentation showing evidence of implementation of Designer’s responsibilities available for review by State Construction Office and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors

Under the single-prime bidding, the separate-prime bidding, construction manager at risk and alternative contracting methods, contractor(s) will:

- a. Attend the scheduled prebid conference.
- b. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.
- c. At least ten (10) days prior to the scheduled day of bid opening, notify minority businesses of potential subcontracting opportunities listed in the proposal. The notification will include the following:
 - (1) A description of the work for which the subbid is being solicited.
 - (2) The date, time and location where subbids are to be submitted.
 - (3) The name of the individual within the company who will be available to answer questions about the project.
 - (4) Where bid documents may be reviewed.
 - (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

If there are more than three (3) minority businesses in the general locality of the project who offer similar contracting or subcontracting services in the specific trade, the contractor(s) shall notify three (3), but may contact more, if the contractor(s) so desires.

- d. During the bidding process, comply with the contractor(s) requirements listed in the proposal for minority participation.
- e. Identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).
- f. Make documentation showing evidence of implementation of PM, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by State Construction Office and HUB Office, upon request.
- g. Upon being named the apparent low bidder, the Bidder shall provide one of the following: (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal; (2) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.
- h. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values. The schedule of values shall be provided as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
- i. The contractor(s) shall submit with each monthly pay request(s) and final payment(s), “MBE Documentation for Contract Payment” – (Appendix E), for designer’s review.
- j. During the construction of a project, at any time, if it becomes necessary to replace a minority business subcontractor, immediately advise the owner, State Construction Office, and the Director of the HUB Office in writing, of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.

- k. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit subbids from minority businesses.
- l. It is the intent of these requirements apply to all contractors performing as prime contractor and first tier subcontractor under construction manager at risk on state projects.

6. Minority Business Responsibilities

While minority businesses are not required to become certified in order to participate in the State construction projects, it is recommended that they become certified and should take advantage of the appropriate technical assistance that is made available. In addition, minority businesses who are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

SECTION 4: DISPUTE PROCEDURES

It is the policy of this state that disputes that involves a person's rights, duties or privileges, should be settled through informal procedures. To that end, minority business disputes arising under these guidelines should be resolved as governed under G.S. 143-128(g).

SECTION 5: These guidelines shall apply upon promulgation on state construction projects. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: www.nc-sco.com

SECTION 6: In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing minority business participation in the state construction program.

MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)

APPLICATION:

The **Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts** are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: <http://www.nc-sco.com>

MINORITY BUSINESS SUBCONTRACT GOALS:

The goals for participation by minority firms as subcontractors on this project have been set at 10%.

The bidder must identify on its bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts **or** affidavit (Affidavit B) of self-performance of work, if the bidder will perform work under contract by its own workforce, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).

The lowest responsible, responsive bidder must provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal.

OR

Provide Affidavit D, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, **with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal.**

OR

Provide Affidavit B, which includes sufficient information for the State to determine that the bidder does not customarily subcontract work on this type project.

The above information must be provided as required. Failure to submit these documents is grounds for rejection of the bid.

MINIMUM COMPLIANCE REQUIREMENTS:

All written statements, affidavits or intentions made by the Bidder shall become a part of the agreement between the Contractor and the State for performance of this contract. Failure to comply with any of these statements, affidavits or intentions, or with the minority business Guidelines shall constitute a breach of the contract. A finding by the State that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the State whether to terminate the contract for breach.

In determining whether a contractor has made Good Faith Efforts, the State will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts. Good Faith Efforts include:

- (1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.
- (2) Making the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.
- (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
- (4) Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- (5) Attending any prebid meetings scheduled by the public owner.
- (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
- (7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- (8) Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- (9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- (10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

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FORM OF PROPOSAL

Popp Martin Student Union, Student Government

Office Renovations

Universite of NC at Charlotte

SCO #18-18336-01A

Contract: _____

Bidder: _____

Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with the State of North Carolina through the University of North Carolina at Charlotte in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the Student Government Office Renovations in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the State of North Carolina, and Little Diversified Architectural Consulting with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

SINGLE PRIME CONTRACT:

Base Bid:

_____ Dollars(\$)

General Subcontractor:

_____ Lic _____

Plumbing Subcontractor:

_____ Lic _____

Mechanical Subcontractor:

_____ Lic _____

Electrical Subcontractor:

_____ Lic _____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

GENERAL CONTRACT:

Alternate No. 1 Door Side Lites and Transoms

(Add) (Deduct)		Dollars(\$)
<u>Alternate No. 2</u>	Acoustic Ceilings (APC2)	
(Add) (Deduct)		Dollars(\$)
<u>Alternate No. 3</u>	New Sink in Breakroom	
(Add) (Deduct)		Dollars(\$)
<u>Alternate No. 4</u>	Owner Preferred Campus Standard Hardware	
(Add) (Deduct)		Dollars(\$)
<u>Alternate No. 5</u>	Vinyl Wall Covering (VWC1 and VWC2)	
(Add) (Deduct)		Dollars(\$)
<u>Alternate No. 6</u>	CWT1 Backsplash in Break/Work Room 216	
(Add) (Deduct)		Dollars(\$)

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B**) to that effect in lieu of Affidavit (**A**) required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

* **OR** *

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A or Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid contract.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

(Name of firm or corporation making bid)

WITNESS:

(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 6 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

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State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

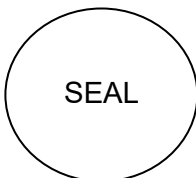
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

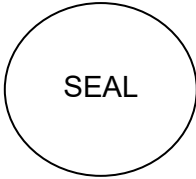
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20__

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
 This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the _____
 (Name of Bidder)

_____ (Project Name)
 Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

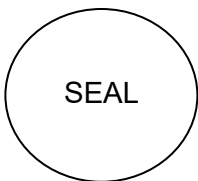
*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____



Signature: _____

Title: _____

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

Project ID# _____ (Project Name) Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

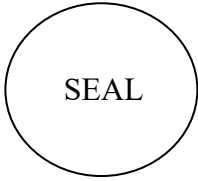
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____

_____ as principal, and _____, as surety, who is duly licensed to act as surety in North Carolina, are held and firmly bound unto the State of North Carolina* through _____ as obligee, in the penal sum of _____ DOLLARS, lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and dated this ____ day of ____ 20__

WHEREAS, the said principal is herewith submitting proposal for and the principal desires to file this bid bond in lieu of making the cash deposit as required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the principal shall be awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful performance thereof within ten days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so execute such contract and give performance bond as required by G.S. 143-129, the surety shall, upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. Provided further, that the bid may be withdrawn as provided by G.S. 143-129.1

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

*(Community college projects: Delete State of North Carolina as owner and replace with community college name.)

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

SCO Project ID: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* TYPE OF MBE	AMOUNT PAID THIS MONTH (With This Pay App)	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black (B), Hispanic (H), Asian American (AA), American Indian (AI), White Female (WF), Socially and Economically Disadvantaged (SED)

Approved/Certified By:

Name

Title

Date

Signature

SUBMIT WITH EACH PAY REQUEST - FINAL PAYMENT - FINAL REPORT

LITTLE™
DIVERSIFIED ARCHITECTURAL CONSULTING

FORM OF CONSTRUCTION CONTRACT

(ALL PRIME CONTRACTS)

THIS AGREEMENT, made the _____ day of _____ in the year of 20__ by _____ and _____ between _____

hereinafter called the Party of the First Part and the State of North Carolina, through the University of North Carolina at Charlotte, hereinafter called the Party of the Second Part.

WITNESSETH:

That the Party of the First Part and the Party of the Second Part for the consideration herein named agree as follows:

1. Scope of Work: The Party of the First Part shall furnish and deliver all of the materials, and perform all of the work in the manner and form as provided by the following enumerated plans, specifications and documents, which are attached hereto and made a part thereof as if fully contained herein: advertisement; Instructions to Bidders; General Conditions; Supplementary General Conditions; specifications; accepted proposal; contract; performance bond; payment bond; power of attorney; workmen's compensation; public liability; property damage and builder's risk insurance certificates; approval of attorney general; certificate by the Office of State Budget and Management, and drawings, titled:

Consisting of the following sheets:

Dated: _____ and the following addenda:

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No _____ Dated: _____ Addendum No. _____ Dated: _____

2. That the Party of the First Part shall commence work to be performed under this agreement on a date to be specified in a written order of the Party of the Second Part and shall fully complete all work hereunder within _____ consecutive calendar days from said date. For each day in excess thereof, liquidated damages shall be as stated in Supplementary General Conditions. The Party of the First Part, as one of the considerations for the awarding of this contract, shall furnish to the Party of the Second

Part a construction schedule setting forth planned progress of the project broken down by the various divisions or part of the work and by calendar days as outlined in Article 14 of the General Conditions of the Contract.

3. The Party of the Second Part hereby agrees to pay to the Party of the First Part for the faithful performance of this agreement, subject to additions and deductions as provided in the specifications or proposal, in lawful money of the United States as follows:

_____ (\$ _____).

Summary of Contract Award:

4. In accordance with Article 31 and Article 32 of the General Conditions of the Contract, the Party of the Second Part shall review, and if approved, process the Party of the First Party's pay request within 30 days upon receipt from the Designer. The Party of the Second Part, after reviewing and approving said pay request, shall make payments to the Party of the First Part on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the First Party, less five percent (5%) of the amount of such estimate which is to be retained by the Second Party until all work has been performed strictly in accordance with this agreement and until such work has been accepted by the Second Party. The Second Party may elect to waive retainage requirements after 50 percent of the work has been satisfactorily completed on schedule as referred to in Article 31 of the General Conditions.

5. Upon submission by the First Party of evidence satisfactory to the Second Party that all payrolls, material bills and other costs incurred by the First Party in connection with the construction of the work have been paid in full, final payment on account of this agreement shall be made within thirty (30) days after the completion by the First Party of all work covered by this agreement and the acceptance of such work by the Second Party.

6. It is further mutually agreed between the parties hereto that if at any time after the execution of this agreement and the surety bonds hereto attached for its faithful performance, the Second Party shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover the performance of the work, the First Party shall, at its expense, within five (5) days after the receipt of notice from the Second Party so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Second Party. In such event no further payment to the First Party shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Second Party.

7. The Party of the First Part attest that it and all of its subcontractors have fully complied with all requirements of NCGS 64 Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

IN WITNESS WHEREOF, the Parties hereto have executed this agreement on the day and date first above written in _____ counterparts, each of which shall without proof or accounting for other counterparts, be deemed an original contract.

Witness:

(Proprietorship or Partnership)

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

The State of North Carolina through*

(CORPORATE SEAL)

(Agency, Department or Institution)

Witness:

By: _____

Title: _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety: _____

Name of Contracting
Body: _____

Amount of Bond: _____

Project

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind, ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the contracting body, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice
Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

FORM OF PAYMENT BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety: _____

Name of Contracting
Body: _____

Amount of Bond: _____

Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By: _____

Title _____
(Owner, Partner, or Corp. Pres. or Vice
Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

Sheet for Attaching Power of Attorney

Sheet for Attaching Insurance Certificates

APPROVAL OF THE ATTORNEY GENERAL

**CERTIFICATION BY THE OFFICE OF STATE
BUDGET AND MANAGEMENT**

Provision for the payment of money to fall due and payable by the

under this agreement has been provided for by allocation made and is available for the purpose of carrying out this agreement.

This _____ day of _____ 20____.

Signed _____
Budget Officer

LITTLE™
DIVERSIFIED ARCHITECTURAL CONSULTING

SECTION 00 65 36 - CONTRACTOR'S GENERAL WARRANTY

UNCC-SGO RENOVATIONS
STUDENT GOVERNMENT OFFICE, STE 200
UNC CHARLOTTE – POPP MARTIN STUDENT UNION
9201 UNIVERSITY CITY BOULEVARD
CHARLOTTE, NORTH CAROLINA 28223

The undersigned Contractor hereby warrants, in accordance with the applicable provisions and terms set forth in the Contract Documents, all materials and workmanship incorporated in UNCC-SGO Renovations, Student Government Office, Ste 200, UNC Charlotte – Popp Martin Student Union, 9201 University City Boulevard, Charlotte, North Carolina 28223, against any and all defects due to faulty materials or workmanship or negligence for a period of 12 months, or such longer periods as set forth in the Contract Documents, from the effective date of Final Acceptance. This Contractor further warrants all work incorporated in this project to remain leakproof and watertight at all points for a period of 24 months from the effective date of Final Acceptance.

This Warranty shall be binding where defects occur due to normal usage conditions and does not cover willful or malicious damage, damage caused by acts of God or other casualty beyond the control of the Contractor.

This Warranty shall be in addition to other warranties and guarantees set forth in the Contract Documents, and shall not act to constitute a waiver of additional protection of the Owner afforded, where applicable, by consumer protection and product liability provisions of law, and these stipulations shall not constitute waiver of any additional rights or remedies available to the Owner under the law.

Signed: _____
Name: _____
Title: _____
Date: _____

(Corporate Seal)

Subscribed and sworn before me this
_____ day of _____, 20____.

(Notary Public)

END OF SECTION 00 65 36

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

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March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

SECTION 00 65 37 - ASBESTOS-FREE WARRANTY

UNCC-SGO RENOVATIONS
STUDENT GOVERNMENT OFFICE, STE 200
UNC CHARLOTTE – POPP MARTIN STUDENT UNION
9201 UNIVERSITY CITY BOULEVARD
CHARLOTTE, NORTH CAROLINA 28223

The undersigned Contractor hereby warrants that no asbestos-containing materials of any kind were used in the construction of the UNCC-SGO Renovations, Student Government Office, UNC Charlotte – Popp Martin Student Union, 9201 University City Boulevard, Charlotte, North Carolina 28223.

Signed: _____

Name: _____

Title: _____

Date: _____

(Corporate Seal)

Subscribed and sworn before me this

_____ day of _____, 20____.

(Notary Public)

END OF SECTION 00 65 37

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

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March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

SECTION 00 72 00 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

The *“Instruction to Bidders and General Conditions of the Contract – Standard Form for Construction Projects – University of North Carolina General Administration”*, shall be the form of General Conditions, and is incorporated into the Contract Documents.

END OF SECTION 00 72 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



**INSTRUCTIONS TO BIDDERS
AND
GENERAL CONDITIONS OF THE CONTRACT**

STANDARD FORM FOR CONSTRUCTION PROJECTS

**UNIVERSITY OF NORTH CAROLINA
GENERAL ADMINISTRATION**

Fifth Edition – January 2015

INSTRUCTIONS TO BIDDERS

For a proposal to be considered it must be in accordance with the following instructions:

1. PROPOSALS

Proposals must be made in strict accordance with the Form of Proposal provided therefor, and all blank spaces for bids, alternates and unit prices applicable to bidders work shall be properly filled in. When requested alternates are not bid, the proposer shall so indicate by the words "No Bid". Any blanks shall also be interpreted as "No Bid". The bidder agrees that bid on Form of Proposal detached from specifications will be considered and will have the same force and effect as if attached thereto. Photocopied or faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates. If figures and writing differ, the written number will supersede the figures.

Any modifications to the Form of Proposal (including alternates and/or unit prices) will disqualify the bid and may cause the bid to be rejected.

The bidder shall fill in the Form of Proposal as follows:

- a. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- b. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- c. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- d. If the proposal is made by a joint venture, it shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable.
- e. All signatures shall be properly witnessed.
- f. If the contractor's license of a bidder is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the proposal. The title "Licensee" shall appear under his/her signature.

Proposals should be addressed as indicated in the Advertisement for Bids and be delivered enclosed in an opaque sealed envelope, marked "Proposal" and bearing the title of the work, name of the bidder, and the contractor's license number of the bidder. Bidders should clearly mark on the outside of the bid envelope which contract(s) they are bidding.

Bidder shall identify with appropriate attachments to the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts or an affidavit indicating work under contract will be self-performed, as required by G.S. 143-128.2 (c) and G.S. 143-128.2 (f). Failure to comply with these requirements is grounds for rejection of the bid.

For projects bid in the single-prime alternative, the names and license numbers of major subcontractors shall be listed on the proposal form.

It shall be the specific responsibility of the bidder to deliver his bid to the proper official at the selected place and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including delivery by any delivery service, shall disqualify the bid.

Unit prices quoted in the proposal shall include overhead and profit and shall be the full compensation for the contractor's cost involved in the work. See General Conditions, Article 19c-1.

2. EXAMINATION OF CONDITIONS

It is understood and mutually agreed that by submitting a bid the bidder acknowledges that he has carefully examined all documents pertaining to the work, the location, accessibility and general character of the site of the work and all existing buildings and structures within and adjacent to the site, and has satisfied himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, the character, quality and quantity of the material to be encountered, the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the work, the general and local conditions, the construction hazards, and all other matters, including, but not limited to, the labor situation which can in any way affect the work under the contract, and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications and other contract documents for the construction of the work and that he accepts all the terms, conditions and stipulations contained therein; and that he is prepared to work in cooperation with other contractors performing work on the site.

Reference is made to contract documents for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by the designer in preparing the documents. The owner will make copies of all such surveys and reports available to the bidder upon request.

Each bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the work. Any on-site investigation shall be done at the convenience of the owner. Any reasonable request for access to the site will be honored by the owner.

3. BULLETINS AND ADDENDA

Any addenda to specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the designer who will send written instructions in the form of addenda to all bidders. Notification should be no later than seven (7) days prior to the date set for receipt of bids. Neither the owner nor the designer will be responsible for any oral instructions.

All addenda should be acknowledged by the bidder(s) on the Form of Proposal. However, even if not acknowledged, by submitting a bid, the bidder has certified that he has reviewed all issued addenda and has included all costs associated within the bid.

4. BID SECURITY

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, or a bid bond in an amount equal to not less than five percent (5%) of the proposal, said deposit to be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten (10) days after the award or to give satisfactory surety as required by law (G.S. 143-129).

Bid bond shall be conditioned that the surety will, upon demand, forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract. The owner may retain bid securities of any bidder(s) who may have a reasonable chance of award of contract for the full duration of time stated in the Notice to Bidders. Other bid securities may be released sooner, at the discretion of the owner. All bid securities (cash or certified checks) shall be returned to the bidders promptly after award of contracts, and no later than seven (7) days after expiration of the holding period stated in the Notice to Bidders. Standard Form of Bid Bond is included in these specifications and shall be used.

5. RECEIPT OF BIDS

Bids shall be received in strict accordance with requirements of the General Statutes of North Carolina. Bid security shall be required as prescribed by statute. Prior to the closing of the bid, the bidder will be permitted to change or withdraw his bid. Guidelines for opening of public construction bids are available from the owner.

6. OPENING OF BIDS

Upon opening, all bids shall be read aloud. Once bidding is closed, there shall not be any withdrawal of bids by any bidder and no bids may be returned by the designer to any bidder. After the opening of bids, no bid may be withdrawn, except under the provisions of General Statute 143-129.1, for a period of thirty days unless otherwise specified. Should the successful bidder default and fail to execute a contract, the contract may be awarded to the next lowest and responsible bidder. The owner reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

- a. If the Form of Proposal furnished to the bidder is not used or is altered.
- b. If the bidder fails to insert a price for all bid items, alternate and unit prices requested.
- c. If the bidder adds any provisions reserving the right to accept or reject any award.
- d. If there are unauthorized additions or conditional bids, or irregularities of any kind which tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
- e. If the bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the owner.
- f. If the unit prices contained in the bid schedule are unacceptable to the owner.
- g. If the bidder fails to comply with other instructions stated herein.

7. BID EVALUATION

The award of the contract will be made to the lowest responsible bidder as soon as practical. The owner may award on the basis of the base bid and any alternates the owner chooses.

Before awarding a contract, the owner may require the apparent low bidder to qualify himself to be a responsible bidder by furnishing any or all of the following data:

- a. The latest financial statement showing assets and liabilities of the company or other information satisfactory to the owner.
- b. A listing of completed projects of similar size.
- c. Permanent name and address of place of business.
- d. The number of regular employees of the organization and length of time the organization has been in business under present name.
- e. The name and home office address of the surety proposed and the name and address of the responsible local claim agent.
- f. The names of members of the firms who hold appropriate trade licenses, together with license numbers.
- g. If prequalified, contractor information may be reviewed and evaluated comparatively to submitted prequalification package.

Failure or refusal to furnish any of the above information, if requested, shall constitute a basis for disqualification of any bidder.

In determining the lowest responsible, responsive bidder, the owner shall take into consideration the bidder's compliance with the requirements of G.S. 143-128.2(c), the past performance of the bidder on construction contracts for the State with particular concern given to completion times, quality of work, cooperation with other contractors, and cooperation with the designer and owner. Failure of the low bidder to furnish affidavit and/or documentation as required by G.S. 143-128.2(c) shall constitute a basis for disqualification of the bid.

Should the owner adjudge that the apparent low bidder is not the lowest responsible, responsive bidder by virtue of the above information, said apparent low bidder will be so notified and his bid security shall be returned to him.

8. PERFORMANCE BOND

The successful bidder, upon award of contract, shall furnish a performance bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

9. PAYMENT BOND

The successful bidder, upon award of contract, shall furnish a payment bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

10. PAYMENTS

Payments to the successful bidders (contractors) will be made on the basis of monthly estimates of completed work. See Article 31, General Conditions.

11. PRE-BID CONFERENCE

Prior to the date set for receiving bids, the Designer may arrange and conduct a Pre-Bid Conference for all prospective bidders. The purpose of this conference is to review project requirements and to respond to questions from prospective bidders and their subcontractors or material suppliers related to the intent of bid documents. Attendance by prospective bidders shall be as required by the "Notice to Bidders".

12. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until ten (10) days prior to the receipt of bids when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

- a. Name, address and telephone number of manufacturer and supplier as appropriate.
- b. Trade name, model or catalog designation.
- c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.
- d. Detailed comparison with specified products including performance capabilities, warranties, and test results.
- e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum.

GENERAL CONDITIONS OF THE CONTRACT

The use or reproduction of this document or any part thereof is authorized for and limited to use on projects of the University of North Carolina, and is distributed by, through and at the discretion of UNC - General Administration, Chapel Hill, North Carolina, for that distinct and sole purpose.

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ARTICLE 1 - DEFINITIONS

- a. The **contract documents** consist of the Notice to Bidders; Instructions to Bidders; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawings and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the proposal; the contract; the performance bond; the payment bond; insurance certificates; the approval of the university attorney; and the certificate of the Office of State Budget and Management. All of these items together form the contract.
- b. The **owner** is the State of North Carolina through the agency named in the contract.
- c. The **designer(s)** are those referred to within this contract, or their authorized representatives. The designer(s), as referred to herein, shall mean architect and/or engineer. They will be referred to hereinafter as if each were of the singular number, masculine gender.
- d. The **contractor**, as referred to hereinafter, shall be deemed to be either of the several contracting parties called the "Party of the First Part" in either of the several contracts in connection with the total project. Where, in special instances hereinafter, a particular contractor is intended, an adjective precedes the word "contractor," as "general," "heating," etc. For the purposes of a single prime contract, the term Contractor shall be deemed to be the single contracting entity identified as the "Party of the First Part" in the single Construction Contract. Any references or adjectives that name or infer multiple prime contractors shall be interpreted to mean the single prime Contractor.
- e. A **subcontractor**, as the term is used herein, shall be understood to be one who has entered into a direct contract with a contractor, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.
- f. **Written notice** shall be defined as notice in writing delivered in person to the contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization by registered mail.
- g. **Work**, as used herein as a noun, is intended to include materials, labor and workmanship of the appropriate contractor.
- h. The **project** is the total construction work to be performed under the contract documents by the several contractors.

- i. **Project expediter**, as used herein, is an entity stated in the contract documents, designated to effectively facilitate scheduling and coordination of work activities. See Article 14(f) for responsibilities of a Project Expediter. **For the purposes of a single prime contract, the single prime contractor shall be designated as the Project Expediter.**
- j. **Change order**, as used herein, shall mean a written order to the contractor subsequent to the signing of the contract authorizing a change in the contract. The change order shall be signed by the contractor and designer and approved by the owner in that order (Article 19).
- k. **Field Order**, as used herein, shall mean a written approval for the contractor to proceed with the work requested by owner prior to issuance of a formal Change Order. The field order shall be signed by the contractor, designer, and owner .
- l. **Time of completion**, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article 23).
- m. **Liquidated damages**, as stated in the contract documents, is an amount reasonably estimated in advance to cover the consequential damages associated with the Owner's economic loss in not being able to use the Project for its intended purposes at the end of the contract's completion date as amended by change order, if any, by reason of failure of the contractor(s) to complete the work within the time specified. Liquidated damages does not include the Owner's extended contract administration costs (including but not limited to additional fees for architectural and engineering services, testing services, inspection services, commissioning services, etc.), such other damages directly resulting from delays caused solely by the contractor, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the Contractor (e.g., if a multi-phased project-subsequent phases, delays in start of other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).
- n. **Surety**, as used herein, shall mean the bonding company or corporate body which is bound with and for the contractor, and which engages to be responsible for the contractor and his acceptable performance of the work.
- o. **Routine written communications between the Designer and the Contractor**, are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, or facsimile. Such communications can not be identified as "request for information."
- p. **Clarification or Request for information (RFI)**, is a request from the Contractor seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the Contractor's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.
- q. **Approval**, means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work.
- r. **Inspection**, shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.

- s. **“Equal to” or “approved equal”**, shall mean materials, products, equipment, assemblies, or installation methods considered equal by the bidder in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents. Acceptance of equal is subject to the approval of the Designer and Owner.
- t. **“Substitution” or “substitute”**, shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified, but which in the opinion of the bidder would improve competition and/or enhance the finished installation. Acceptance of substitution is subject to the approval of the Designer and Owner.
- u. **Provide** shall mean furnish and install complete in place, new, clean, operational, and ready for use.
- v. **Indicated and shown** shall mean provide as detailed, or called for, and reasonably implied in the contract documents.
- w. **Special inspector** is one who inspects materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with the approved construction documents and referenced standards.
- x. **Commissioning** is a quality assurance process that verifies and documents that building components and systems operate in accordance with the project design documents.
- y. **Designer Final Inspection** is the inspection performed by the design team to determine the completeness of the project in accordance with approved plans and specifications. This inspection occurs prior to SCO final inspection.
- z. **SCO Final Inspection** is the inspection performed by the State Construction Office to determine the completeness of the project in accordance with North Carolina Building Codes.
- aa. **Beneficial Occupancy** is requested by the owner and is occupancy or partial occupancy of the building or project after all life safety items have been completed as determined by the State Construction Office. Life safety items include but are not limited to fire alarm, sprinkler, egress and exit lighting, fire rated walls, egress paths and security.
- bb. **Final Acceptance** is the date on which the State Construction Office approves the project as complying with the North Carolina Building Codes and the owner accepts the construction as totally complete. This includes certification by the Designer that all punch list items are completed.

ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- a. The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a bid for a complete job. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.

- b. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.
- c. The contractor shall execute each copy of the proposal, contract, performance bond and payment bond as follows:
 - 1. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
 - 2. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
 - 3. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
 - 4. If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable to each particular member.
 - 5. All signatures shall be properly witnessed.
 - 6. If the contractor's license is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
 - 7. The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
 - 8. Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in North Carolina. The title "Licensed Resident Agent" shall appear after the signature.
 - 9. The seal of the bonding company shall be impressed on each signature page of the bonds.
 - 10. The contractor's signature on the performance bond and the payment bond shall correspond with that on the contract. The date of the performance and payment bond shall not be prior to the date of the contract.

ARTICLE 3 - CLARIFICATIONS AND DETAIL DRAWINGS

- a. In such cases where the nature of the work requires clarification by the designer, such clarification shall be furnished by the designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- b. The contractor(s) and the designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject

to addition or change in accordance with progress of the work. The designer shall furnish drawings or clarifications in accordance with that schedule. The contractor shall not proceed with the work without such detail drawings and/or written clarifications.

ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

The designer or owner shall furnish free of charge to the contractors electronic copies of plans and specifications. If requested by the contractor, paper copies of plans and specifications shall be furnished free of charge as follows:

- a. General contractor - Up to twelve (12) sets of general contractor drawings and specifications, up to six (6) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.
- b. Each other contractor - Up to six (6) sets of the appropriate drawings and specifications, up to three (3) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.
- c. Additional sets shall be furnished at cost, including mailing, to the contractor upon request by the contractor. This cost shall be stated in the bidding documents.
- d. For the purposes of a single-prime contract, the contractor shall receive up to 30 sets of drawings and specifications, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- a. Within 15 consecutive calendar days after the notice to proceed, each prime contractor shall submit a schedule for submission of all shop drawings, product data, samples, and similar submittals through the Project Expediter to the Designer. This schedule shall indicate the items, relevant specification sections, other related submittal data, and the date when these items will be furnished to the designer.
- b. The Contractor(s) shall review, approve and submit to the Designer all Shop Drawings, Coordination Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Required Submittals shall bear the Contractor's stamp of approval, any exceptions to the Contract Documents shall be noted on the submittals, and copies of all submittals shall be of sufficient quantity for the Designer to retain up to three (3) copies of each submittal for his own use plus additional copies as may be required by the Contractor. Submittals shall be presented to the Designer in accordance with the schedule submitted in paragraph (a) so as to cause no delay in the activities of the Owner or of separate Contractors.
- c. The Designer shall review required submittals promptly, noting desired corrections if any, and retaining two (2) copies (one for the Designer, one for the owner) for his use. The remaining copies of each submittal shall be returned to the Contractor not later than twenty (20) days from the date of receipt by the Designer, for the Contractor's use or for corrections and resubmittal as noted by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals.

- d. Approval of shop drawings/submittals by the Designer shall not be construed as relieving the Contractor from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such lack of compliance or errors first have been called in writing to the attention of the Designer by the Contractor.

ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

- a. The contractor shall maintain, in readable condition at his job office, one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the designer, his authorized representative, the owner or State Construction Office..
- b. The contractor shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the contractor and submitted to the designer upon project completion and no later than 30 days after final acceptance of the project.
- c. The contractor shall maintain at the job office a record of all required tests that have been performed, clearly indicating the scope of work inspected and the date of approval or rejection.

ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications are instruments of service and remain the property of the State of North Carolina. The use of these instruments on work other than this contract without permission of the owner is prohibited. All copies of drawings and specifications other than contract copies shall be returned to the owner upon request after completion of the work.

ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

- a. The contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the contractor shall furnish evidence as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer

combination listed. However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Request for substitution of materials, items or equipment shall be submitted to the designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Alternate materials may be requested after the award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and owner approve.

- e. The designer is the judge of equality for proposed substitution of products, materials or equipment.
- f. If at any time during the construction and completion of the work covered by these contract documents, the language, conduct, or attire of any workman of the various crafts be adjudged a nuisance by the owner or designer, or if any workman be considered detrimental to the work, the contractor shall order such parties removed immediately from grounds.

ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS

It is the intention of the contract documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The contractor shall protect and save harmless the owner against suit on account of alleged or actual infringement. The contractor shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

- a. The contractor shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the designer in writing. See Instructions to Bidders, Paragraph 3, Bulletins and Addenda. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the designer, he shall bear all cost arising therefrom. Additional requirements implemented after bidding will be subject to equitable negotiations.
- b. All work under this contract shall conform to the North Carolina State Building Code and other state, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the contractor and included within the bid proposal. All water taps, meter barrels, vaults and impact fees shall be paid by the contractor unless otherwise noted.
- c. Projects constructed by the State of North Carolina or by any agency or institution of the state are not subject to inspection by any county or municipal authorities and are not subject to county or municipal building codes. The contractor shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits shall be obtained at no cost.

- d. Projects involving local funding may be subject also to county and municipal building codes and inspection by local authorities. The Contractor shall pay the cost of these permits and inspections as noted in the specifications.

ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- a. The contractors shall be jointly responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the owner or designer, and by laws or ordinances governing such conditions. They shall be responsible for any damage to the owner's property, or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. They shall be responsible for and pay for any damages caused to the owner. All contractors shall have access to the project at all times.
- b. The contractor shall provide cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building, whether set by him, or any of the subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the owner.
- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the designer and owner.
- d. The contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around same. He shall barricade all walks, roads, etc., as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The contractor shall provide all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.
- f. The contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.
- g. The contractor shall designate a responsible member of his organization as safety officer/inspector, to inspect the project site for unsafe health and safety hazards, to report these hazards to the contractor for correction, and whose duties also include accident prevention on the project, and to provide other safety and health measures on the project site as required by the terms and conditions of the contract. The name of the safety inspector shall be made known to the designer and owner at the time of the preconstruction conference and in all cases prior to any work starting on the project.

- h. In the event of emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the contractor is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the contractor on account of such action shall be determined as provided for under Article 19(b).
- i. Any and all costs associated with correction of damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to correction of damage caused by flooding, mud, sand, stone, debris, and discharging of waste products.

ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- a. Any land-disturbing activity performed by the contractor(s) in connection with the project shall comply with all erosion control measures set forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C).
- b. Upon receipt of notice that a land-disturbing activity is in violation of said act, the contractor(s) shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- c. The contractor(s) shall be responsible for defending any legal actions instituted pursuant to N.C.G.S. 113A-64 against any party or persons described in this article.
- d. To the fullest extent permitted by law, the contractor(s) shall indemnify and hold harmless the owner, the designer and the agents, consultants and employees of the owner and designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of work or failure of performance of work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

ARTICLE 13 - INSPECTION OF THE WORK

- a. It is a condition of this contract that the work shall be subject to inspection during normal working hours and during any time work is in preparation and progress by the designer, designated official representatives of the owner, State Construction Office, and those persons required by state law to test special work for official approval. The contractor shall therefore provide safe access to the work at all times for such inspections.
- b. All instructions to the contractor will be made only by or through the designer or his designated project representative. Observations made by official representatives of the owner shall be conveyed to the designer for review and coordination prior to issuance to the contractor.
- c. All work shall be inspected by the designer, special inspector and/or State Construction Office prior to being covered by the contractor. Contractor shall give a minimum notice of two weeks unless otherwise agreed to by all parties. If inspection fails, after the first

re-inspection all costs associated with additional inspections shall be borne by the contractor.

- d. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the contractor shall give adequate notice to the designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the designer. Such special tests or inspections will be made in the presence of the designer, or his authorized representative, and it shall be the contractor's responsibility to serve ample notice of such tests.
- e. All laboratory tests shall be paid by the owner unless provided otherwise in the contract documents except the general contractor shall pay for laboratory tests to establish design mix for concrete, and for additional tests to prove compliance with contract documents where materials have tested deficient except when the testing laboratory did not follow the appropriate ASTM testing procedures.
- f. Should any work be covered up or concealed prior to inspection and approval by the designer, special inspector, and/or State Construction Office such work shall be uncovered or exposed for inspection, if so requested by the designer in writing. Inspection of the work will be made upon notice from the contractor. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the contractor involved.

ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

- a. Throughout the progress of the work, each contractor shall keep at the job site a competent superintendent and supervisory staff satisfactory to the designer and the owner. The superintendent and supervisory staff shall not be changed without the consent of the designer and owner unless said superintendent ceases to be employed by the contractor or ceases to be competent as determined by the contractor, designer and owner. The superintendent and other staff designated by the contractor in writing shall have authority to act on behalf of the contractor, and instructions, directions or notices given to him shall be as binding as if given to the contractor. However, directions, instructions and notices shall be confirmed in writing.
- b. The contractor shall examine and study the drawings and specifications and fully understand the project design, and shall provide constant and efficient supervision to the work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- c. All contractors shall be required to cooperate and consult with each other during the construction of this project. Prior to installation of work, all contractors shall jointly prepare coordination drawings, showing locations of various ductworks, piping, motors, pumps, and other mechanical or electrical equipment, in relation to the structure, walls and ceilings. These drawings shall be submitted to the designer through the Project Expediter for information only. Each contractor shall lay out and execute his work to cause the least delay to other contractors. Each contractor shall be financially responsible for any damage to other contractor's work and for undue delay caused to other contractors on the project.

- d. The contractor is required to attend job site progress conferences as called by the designer. The contractor shall be represented at these job progress conferences by both home office and project personnel. These representatives shall have authority to act on behalf of the contractor. These meetings shall be open to subcontractors, material suppliers and any others who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified contract time. Each contractor shall be prepared to assess progress of the work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The designer or his authorized representative shall be the coordinator of the conferences and shall preside as chairman. The contractor shall turn over a copy of his daily reports to the designer and owner at the job site project conference. The owner will determine the daily report format.
- e. The contractor(s) shall employ an engineer or a land surveyor licensed in the State of North Carolina to lay out the work and to establish a bench mark in a location where same will not be disturbed and where direct instruments sights may be taken.
- f. The designer shall designate a project expediter on projects involving two or more prime contracts. The project expediter shall be designated in the Supplementary General Conditions. The Project Expediter shall have at a minimum the following responsibilities:
 - 1. Prepare the project construction schedule and shall allow all prime contractors (multi-prime contract) and subcontractors (single-prime contract) performing general, plumbing, HVAC, and electrical work equal input into the preparation of the initial construction schedule.
 - 2. Maintain a project progress schedule for all contractors.
 - 3. Give adequate notice to all contractors to ensure efficient continuity of all phases of the work.
 - 4. Notify the designer of any changes in the project schedule.
 - 5. Recommend to the owner whether payment to a contractor shall be approved.
- g. It shall be the responsibility of the Project Expediter to cooperate with and obtain from several prime contractors and subcontractors on the job, their respective work activities and integrate these activities into a project construction schedule in form of a detailed bar chart or Critical Path Method (CPM) schedule. Each prime contractor shall provide work activities within fourteen (14) days of request by the Project Expediter. A "work activity", for scheduling purposes, shall be any component or contractual requirement of the project requiring at least one (1) day, but not more than fourteen (14) days, to complete or fulfill. The project construction schedule shall graphically show all salient features of the work required to construct the project from start to finish and within the allotted time established in the contract. The time (in days) between the contractor's early completion and contractual completion dates is part of the project total float time; and shall be used as such, unless amended by a change order. On a multi-prime project, each prime contractor shall review the proposed construction schedule and approve same in writing. The Project Expediter shall submit the proposed construction schedule to the designer for comments. The complete Project construction schedule shall be of the type set forth in the Supplementary General Condition or subparagraph (1) or (2) below, as appropriate:

1. For a project with total contracts of \$500,000 or less, a bar chart schedule will satisfy the above requirement. The schedule shall indicate the estimated starting and completion dates for each major element of the work.
2. For a project with total contracts over \$500,000, a Critical Path Method (CPM) schedule shall be utilized to control the planning and scheduling of the Work. The CPM schedule shall be the responsibility of the Project Expediter and shall be paid for by the Project Expediter.

Bar Chart Schedule, Where a bar chart schedule is required, it shall be time-scaled in weekly increments, shall indicate the estimated starting and completion dates for each major element of the work by trade and by area, level, or zone, and shall schedule dates for all salient features, including but not limited to the placing of orders for materials, submission of shop drawings and other Submittals for approval, approval of shop drawings by designers, the manufacture and delivery of material, the testing and the installation of materials, supplies and equipment, and all Work activities to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all commissioning, required inspections and completion of final punch list(s). Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

CPM Schedule, Where a CPM schedule is required, it shall be in time-scaled precedence format using the Project Expediter's logic and time estimates. The CPM schedule shall be drawn or plotted with activities grouped or zoned by Work area or subcontract as opposed to a random (or scattered) format. The CPM schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features of the work to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all commissioning, required inspections and completion of final punch list(s). Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

The CPM schedule will identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, and clearly highlight all activities on the critical path. "Total float" and "free float" shall be indicated for all activities. Float time shall not be considered for the exclusive use or benefit of either the Owner or the Contractor, but must be allocated in the best interest of completing the Work within the Contract time. Extensions to the Contract time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change.

Early Completion of Project, The Contractor may attempt to complete the project prior to the Contract Completion Date. However, such planned early completion shall be for the Contractor's convenience only and shall not create any additional rights of the Contractor or obligations of the Owner under this Contract, nor shall it change the Time for Completion or the Contract Completion Date. The Contractor shall not be required to pay liquidated damages to the Owner because of its failure to complete by its planned earlier date. Likewise, the Owner shall not pay the Contractor any additional compensation for early completion nor will the Owner owe the Contractor any compensation should the Owner, its officers, employees, or agents cause the Contractor not to complete earlier than the date required by the Contract Documents.

- h. The proposed project construction schedule shall be presented to the designer no later than fifteen (15) days after written notice to proceed. No application for payment will be processed until this schedule is accepted by the designer and owner.

- i. The approved project construction schedule shall be distributed to all contractors and displayed at the job site by the Project Expediter.
- j. The several contractors shall be responsible for their work activities and shall notify the project expediter of any necessary changes or adjustments to their work. The project Expediter shall maintain the project construction schedule, making biweekly adjustments, updates, corrections, etc., that are necessary to finish the project within the Contract time, keeping all contractors and the designer fully informed. Copy of a bar chart schedule annotated to show the current progress shall be submitted by the Contractor(s) to the designer, along with monthly request for payment. For project requiring CPM schedule, the Contractor shall submit a biweekly report of the status of all activities. The bar chart schedule or biweekly status report shall show the actual Work completed to date in comparison with the original Work scheduled for all activities. If any activities of the work of several contractors are behind schedule, the contractor must indicate in writing, what measures will be taken to bring each such activity back on schedule and to ensure that the Contract Completion Date is not exceeded. A plan of action and recovery schedule shall be developed and submitted to the designer by the Project Expediter, when (1) the contractor's report indicates delays, that are in the opinion of the designer or the owner, of sufficient magnitude that the contractor's ability to complete the work by the scheduled completion is brought into question; (2) the updated construction schedule is thirty (30) days behind the planned or baseline schedule and no legitimate time extensions, as determined by the designer, are in process; and (3) the contractor desires to make changes in the logic (sequencing of work) or the planned duration of future activities of the CPM schedule which, in the opinion of the designer or the owner, are of a major nature. The plan of action, when required shall be submitted to the Owner for review within two (2) business days of the Contractor receiving the Owner's written demand. The recovery schedule, when required, shall be submitted to the Owner within five (5) calendar days of the Contractor's receiving the Owner's written demand. Failure to provide an updated construction schedule or a recovery schedule may be grounds for rejection of payment applications or withholding of funds as set forth in Article 33.
- k. The project expediter shall notify each contractor of such events or time frames that are critical to the progress of the job. Such notice shall be timely and reasonable. Should the progress be delayed due to the work of any of the several contractors, it shall be the duty of the project expediter to immediately notify the contractor(s) responsible for such delay, the designer, the owner and other prime contractors. The designer shall determine the contractor(s) who caused the delays notify the bonding company of the responsible contractor(s) of the delays and shall make a recommendation to the owner regarding further action.
- l. Designation as project expediter entails an additional project control responsibility and does not alter in any way the responsibility of the contractor so designated, nor the responsibility of the other contractors involved in the project. The project expediter's superintendent(s) shall be in attendance at the project site at all times when work is in progress unless conditions are beyond the control of the contractor or until termination of the contract in accordance with the contract documents. It is understood that such superintendent shall be acceptable to the owner and designer and shall be the one who will be continued in that capacity for the duration of the project unless he ceases to be on the contractor's payroll or the owner otherwise agrees. The time commitment of the project superintendent to the project shall be such as to insure satisfactory construction progress & coordination as determined by the project designer and owner and may be as stipulated in the Supplementary General Conditions.

ARTICLE 15 - SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS

- a. Public contracts may be delivered by the following construction delivery methods: single-prime, dual (single-prime and separate-prime), construction manager at risk, and alternative contracting method as approved by the State Building Commission. The owner reserves the right to prepare separate specifications, receive separate bids, and award separate contracts for such other major items of work as may be in the best interest of the State. For the purposes of a single prime contract, refer to Article 1 – Definitions.
- b. All contractors shall cooperate with each other in the execution of their work, and shall plan their work in such manner as to avoid conflicting schedules or delay of the work. See Article 14, Construction Supervision.
- c. If any part of contractor's work depends upon the work of another contractor, defects which may affect that work shall be reported to the designer in order that prompt inspection may be made and the defects corrected. Commencement of work by a contractor where such condition exists will constitute acceptance of the other contractor's work as being satisfactory in all respects to receive the work commenced, except as to defects which may later develop. The designer shall be the judge as to the quality of work and shall settle all disputes on the matter between contractors.
- d. Any mechanical or electrical work such as sleeves, inserts, chases, openings, penetrations, etc., which is located in the work of the general contractor shall be built in by the general contractor. The respective mechanical and electrical contractors shall set all sleeves, inserts and other devices that are to be incorporated into the structure in cooperation and under the supervision of the general contractor. The responsibility for the exact location of such items shall be that of the mechanical and/or electrical contractor.
- e. The designer and the owner shall have access to the work whenever it is in preparation and progress during normal working hours. The contractor shall provide facilities for such access so the designer may perform his functions under the contract documents.
- f. Should a contractor cause damage to the work or property of another contractor, he shall be directly responsible, and upon notice, shall promptly settle the claim or otherwise resolve the dispute.

ARTICLE 16 - SUBCONTRACTS AND SUBCONTRACTORS

- a. Within thirty (30) days after award of the contract, the contractor shall submit to the designer and to the owner a list giving the names and addresses of subcontractors and equipment and material suppliers he proposes to use, together with the scope of their respective parts of the work. Should any subcontractor be disapproved by the designer, the designer shall submit his reasons for disapproval in writing to the owner for the owner's consideration with a copy to the contractor. If the owner concurs with the designer's recommendation, the contractor shall submit a substitute for approval. The designer shall act promptly in the approval of subcontractors, and when approval of the list is given, no changes of subcontractors will be permitted except for cause or reason considered justifiable by the designer.
- b. The designer will furnish to any subcontractor, upon request, evidence regarding amounts of money paid to the contractor on account of the subcontractor's work.
- c. The contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The contractor agrees that no

contractual relationship exists between the subcontractor and the owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the contractor.

- d. The owner reserves the right to limit the amount of portions of work to be subcontracted as hereinafter specified.

ARTICLE 17 - CONTRACTOR AND SUBCONTRACTOR RELATIONSHIPS

The contractor agrees that the terms of these contract documents shall apply equally to each subcontractor as to the contractor, and the contractor agrees to take such action as may be necessary to bind each subcontractor to these terms. The contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to contractor-subcontractor relationships, and that payments to subcontractors shall be made in accordance with the provisions of G.S. 143-134.1 titled "Interest on final payments due to prime contractors: payments to subcontractors."

- a. On all public construction contracts which are let by a board or governing body of the state government or any political subdivision thereof, except contracts let by the Department of Transportation pursuant to G.S. 136-28.1, the balance due prime contractors shall be paid in full within 45 days after respective prime contracts of the project have been accepted by the owner, certified by the architect, engineer or designer to be completed in accordance with terms of the plans and specifications, or occupied by the owner and used for the purpose for which the project was constructed, whichever occurs first. Provided, however, that whenever the architect or consulting engineer in charge of the project determines that delay in completion of the project in accordance with terms of the plans and specifications is the fault of the contractor, the project may be occupied and used for the purposes for which it was constructed without payment of any interest on amounts withheld past the 45 day limit. No payment shall be delayed because of the failure of another prime contractor on such project to complete his contract. Should final payment to any prime contractor beyond the date such contracts have been certified to be completed by the designer or architect, accepted by the owner, or occupied by the owner and used for the purposes for which the project was constructed, be delayed by more than 45 days, said prime contractor shall be paid interest, beginning on the 46th day, at the rate of one percent (1%) per month or fraction thereof unless a lower rate is agreed upon on such unpaid balance as may be due. In addition to the above final payment provisions, periodic payments due a prime contractor during construction shall be paid in accordance with the payment provisions of the contract documents or said prime contractor shall be paid interest on any such unpaid amount at the rate stipulated above for delayed final payments. Such interest shall begin on the date the payment is due and continue until the date on which payment is made. Such due date may be established by the terms of the contract. Funds for payment of such interest on state-owned projects shall be obtained from the current budget of the owning department, institution or agency. Where a conditional acceptance of a contract exists, and where the owner is retaining a reasonable sum pending correction of such conditions, interest on such reasonable sum shall not apply.
- b. Within seven days of receipt by the prime contractor of each periodic or final payment, the prime contractor shall pay the subcontractor based on work completed or service provided under the subcontract. Should any periodic or final payment to the subcontractor be delayed by more than seven days after receipt of periodic or final payment by the prime contractor, the prime contractor shall pay the subcontractor interest, beginning on the eighth day, at the rate of one percent (1%) per month or fraction thereof on such unpaid balance as may be due.

- c. The percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the owner to the prime contractor. Any percentage of retainage on payments made by the prime contractor to the subcontractor that exceeds the percentage of retainage on payments made by the owner to the prime contractor shall be subject to interest to be paid by the prime contractor to the subcontractor at the rate of one percent (1%) per month or fraction thereof.
- d. Nothing in this section shall prevent the prime contractor at the time of application and certification to the owner from withholding application and certification to the owner for payment to the subcontractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of subcontractor to make timely payments for labor, equipment and materials; damage to prime contractor or another subcontractor; reasonable evidence that subcontract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by owner.

ARTICLE 18 - DESIGNER'S STATUS

- a. The designer shall provide general administration of the performance of construction contracts, including liaison and necessary inspection of the work to ensure compliance with plans and specifications. He is the agent of the owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to direct work to be performed, to stop work, to order work removed, or to order corrections of faulty work where any such action by the designer may be necessary to assure successful completion of the work.
- b. The designer is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the owner and the contractor, taking sides with neither.
- c. Should the designer cease to be employed on the work for any reason whatsoever, then the owner shall employ a competent replacement who shall assume the status of the former designer.
- d. The designer and his consultants will make inspections of the project. They will inspect the progress, the quality and the quantity of the work.
- e. The designer and the owner shall have access to the work whenever it is in preparation and progress during normal working hours. The contractor shall provide facilities for such access so the designer and owner may perform their functions under the contract documents.
- f. Based on the designer's inspections and evaluations of the project, the designer shall issue interpretations, directives and decisions as may be necessary to administer the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract.

ARTICLE 19 - CHANGES IN THE WORK

- a. The owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of

the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.

- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of an approved change order or written field order from the designer, countersigned by the owner. No claim for adjustments of the contract price shall be valid unless this procedure is followed.

A field order, transmitted by fax or hand-delivered, may be used where the change involved impacts the critical path of the work. A formal change order shall be issued as expeditiously as possible.

In the event of emergency endangering life or property, the contractor may be directed to proceed on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined below under either c.1 or c.2 or both.

- c. In determining the values of changes, either additive or deductive, contractors are restricted to the use of the following methods:

- 1. Where the extra work involved is covered by unit prices quoted in the proposal, or subsequently agreed to by the contractor, designer and owner, the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed on the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c2 herein. If neither party elects to proceed under c2, then unit prices shall apply.
- 2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.

- d. Under Paragraph b and c.2. above, the allowances for overhead and profit combined shall be as follows: all contractors (the single contracting entity (prime), his subcontractors (first tier), or their subcontractors (second tier, third tier, etc.) shall be allowed a maximum of ten percent (10%) on work they each self-perform; the prime contractor shall be allowed a maximum of five percent (5%) on contracted work of his first tier subcontractor; first tier, second tier, third tier, etc. subcontractors shall be allowed a maximum of two and one-half percent (2.5%) on the contracted work of their subcontractors. Under c.1. no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under c.2. and b. above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.

- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:

- 1. The actual costs of materials and supplies incorporated or consumed as part of the work.
- 2. The actual costs of labor expended on the project site. Labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or on the project site.

3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor.
4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; vehicles; and temporary facilities required for the work.
5. The actual costs of premiums for bonds, insurance, permit fees, and sales or use taxes related to the work.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the owner.

- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a unit cost breakdown showing method of arriving at net cost as defined above.
- g. In all change orders, the procedure will be for the designer to request proposals for the change order work in writing. The contractor will provide such proposal and supporting data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to a lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis for a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer, the designer shall prepare the change order and forward to the contractor for his signature or otherwise respond, in writing, to the contractor's proposal. Within seven (7) days after receipt of the change order executed by the contractor, the designer shall certify the change order by his signature, and forward the change order and all supporting data to the owner for the owner's approval. The owner shall approve and execute the change order within seven (7) days of receipt. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or field orders approved by all parties, then shall be substantiated in writing as outlined under normal procedure.
- h. At the time of signing a change order, the contractor shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."
- i. A change order, when issued, shall be full compensation, or credit, for the extra work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.

- j. If, during the progress of the work, the owner requests a change order and the contractor's terms are unacceptable, the owner may require the contractor to perform such work on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner a correct account of the cost together with all proper invoices, payrolls and supporting data. Upon completion of the work a change order will be prepared with allowances for overhead and profit per paragraph d. above and "net cost" and "cost" per paragraph c. above. Without prejudice, nothing in this paragraph shall preclude the owner from performing or having performed that portion of the work requested in the change order.

ARTICLE 20 - CLAIMS FOR EXTRA COST

- a. Should the contractor consider that as a result of instructions given by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days. The written notice shall clearly state that a claim for extra cost is being made and shall provide a detailed justification for the extra cost. The contractor shall not proceed with the work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article 19(b) and Article 11(h). No claims for extra compensation shall be considered unless the claim is so made. The designer shall render a written decision within seven (7) days of receipt of claim.
- b. The contractor shall not act on instructions received by him from persons other than the designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The designer shall not be responsible for misunderstandings claimed by the contractor of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.
- c. Should a claim for extra compensation by the contractor that complies with the requirements of (a) above be denied by the designer or owner, and cannot be resolved by a representative of The University of North Carolina General Administration, the contractor may request a mediation in connection with G.S. 143-128(f1) in the dispute resolution rules adopted by the State Building Commission (1 N.C.A.C. 30H .0101 through .1001). If the contractor is unable to resolve its claims as a result of mediation, the contractor may pursue his claim in accordance with the provisions of G.S. 143-135.3 and the following:
 1. A contractor who has not completed a contract with an institution of The University of North Carolina and who has not received the amount he claims is due under the contract may submit a verified written claim to the Associate Vice President for Finance & University Property Officer of The University of North Carolina General Administration for the amount the contractor claims is due. If the claim remains unresolved after review by the Associate Vice President for Finance, the contractor may submit the verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the contractor claims is due. The Director may deny, allow or compromise the claim, in whole or in part. A claim under this subsection is not a contested case under Chapter 150B of the General Statutes.
 2. (a) A contractor who has completed a contract with an institution of University of North Carolina for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim

to the Associate Vice President for Finance & University Property Officer of The University of North Carolina General Administration for the amount the contractor claims is due. If the claim remains unresolved after review by the Associate Vice President for Finance, the contractor may submit the verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the contractor claims is due. The claim shall be submitted within sixty (60) days after the contractor receives a final statement of the Associate Vice President's disposition of his claim and shall state the factual basis for the claim.

- (b) The Director shall investigate a submitted claim within ninety (90) days of receiving the claim, or within any longer time period upon which the Director and the contractor agree. The contractor may appear before the Director, either in person or through counsel, to present facts and arguments in support of his claim. The Director may allow, deny or compromise the claim, in whole or in part. The Director shall give the contractor a written statement of the Director's decision on the contractor's claim.
- (c) A contractor who is dissatisfied with the Director's decision on a claim submitted under this subsection may commence a contested case on the claim under Chapter 150B of the General Statutes. The contested case shall be commenced within sixty (60) days of receiving the director's written statement of the decision.
- (d) As to any portion of a claim that is denied by the director, the contractor may, in lieu of the procedures set forth in the preceding subsection of this section, within six (6) months of receipt of the director's final decision, institute a civil action for the sum he claims to be entitled to under the contract by filing a verified complaint and the issuance of a summons in the Superior Court of Wake County or in the superior court of any county where the work under the contract was performed. The procedure shall be the same as in all civil actions except that all issues shall be tried by the judge, without a jury.

ARTICLE 21 - MINOR CHANGES IN THE WORK

The designer will have the authority to order minor changes in the work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order, copied to the owner, and shall be binding on the owner and the contractor.

ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the owner and the designer, the owner shall be reimbursed by the contractor. A change order will be issued to reflect a reduction in the contract sum.

ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- a. The time of completion is stated in the Supplementary General Conditions and in the Form of Construction Contract. The Project Expediter, upon notice of award of contract, shall prepare a construction schedule to complete the project within the time of completion as required by Article 14.

- b. The contractors shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the designer and shall fully complete all work hereunder within the time of completion stated. Time is of the essence and the contractor acknowledges the owner will likely suffer financial damage for failure to complete the work within the time of completion. For each day in excess of the above number of days, the contractor(s) shall pay the owner the sum stated as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the owner by reason of failure of said contractor(s) to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof.
- c. In the event of multiple prime contractors, the designer shall be the judge as to the division of responsibility between the contractor(s), based on the construction schedule, weekly reports and job records, and shall apportion the amount of liquidated damages to be paid by each of them, according to delay caused by any or all of them.
- d. If the contractor is delayed at any time in the progress of his work solely by any act or negligence of the owner, the designer, or by any employee of either; by any separate contractor employed by the owner; by changes ordered in the work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the work is performed; by unavoidable casualties; by any causes beyond the contractor's control; or by any other causes which the designer and owner determine may justify the delay, then the contract time may be extended by change order only for the time which the designer and owner may determine is reasonable.

Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the contractor reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved updated schedule. Time extensions for weather delays, acts of God, labor disputes, fires, delays in transportation, unavoidable casualties or other delays which are beyond the control of the owner do not entitle the contractor to compensable damages for delay. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

- e. Request for extension of time shall be made in writing to the designer with copies to the owner within twenty (20) days following cause of delay. In case of continuing cause for delay, the contractor shall notify the designer in writing with copies to the owner of the delay within twenty (20) days of the beginning of the delay and only one claim is necessary.
- f. The contractor shall notify his surety in writing of extension of time granted.
- g. No claim for time extension shall be allowed on account of failure of the designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article 5c. Demand must be in written form clearly stating the potential

for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

ARTICLE 24 - PARTIAL UTILIZATION BENEFICIAL OCCUPANCY

- a. The owner may desire to occupy or utilize all or a portion of the project prior to completion of the project.
- b. Should the owner request a utilization of the building or portion thereof, the designer shall perform a designer final inspection of the area after being notified by the contractor that the area is ready for such. After the contractor has completed designer final inspection punch list and the designer has verified, the designer shall schedule a beneficial occupancy inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office. If beneficial occupancy is granted by the owner and State Construction Office, in such areas the following will be established:
 1. The beginning of guarantees and warranties period for the equipment necessary to provide support in the area.
 2. The owner assumes all responsibilities for utility costs for the entire building
 3. Contractor will obtain consent of surety.
 4. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.
- c. The owner shall have the right to exclude the contractor from any part of the project which the designer has so certified to be substantially complete, but the owner will allow the contractor reasonable access to complete or correct work to bring it into compliance with the contract.
- d. Occupancy by the owner under this article will in no way relieve the contractor from his contractual requirement to complete the project within the specified time. The contractor will not be relieved of liquidated damages because of beneficial occupancy. The designer may prorate liquidated damages based on the percentage of project occupied.
- e. In the event of Beneficial Occupancy, the contractor shall complete all remaining work and punch list items and schedule Final Acceptance Inspection within 30 days of the date of Beneficial Occupancy. After 30 days, any additional services required of the Designer and the Owner for extended Construction Administration shall be payable by the Contract or via deductive change order.

ARTICLE 25 - FINAL INSPECTION, ACCEPTANCE AND PROJECT CLOSEOUT

- a. Upon notification from the contractor(s) that the project is complete and ready for inspection, the designer shall make a designer final inspection to verify that the project is complete and ready for owner and SCO final inspection. Prior to owner & SCO final inspection, the contractor(s) shall complete all items requiring corrective measures noted at the designer final inspection. The designer shall schedule a SCO final inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office.
 - b. At the SCO final inspection, the designer and his consultants shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the SCO final inspection,

the designer, the owner and State Construction Office representatives shall make one of the following determinations:

1. That the project is completed and accepted.
 2. That the project will be accepted subject to correction of the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of SCO final inspection or the owner may invoke Article 28, Owner's Right to Do Work.
 3. That the project is not complete and another date for a SCO final inspection will be established.
- c. Within fourteen (14) days of final acceptance per Paragraph b1 or within fourteen (14) days after completion of punch list per Paragraph b2 above, the designer shall certify the work and issue applicable certificate(s) of compliance.
- d. Any discrepancies listed or discovered after the date of SCO final inspection and acceptance under Paragraphs b1 or b2 above, shall be handled in accordance with Article 42, Guarantee.
- e. The final acceptance date will establish the following:
1. The beginning of guarantees and warranties period.
 2. The date on which the contractor's insurance coverage for public liability, property damage and builder's risk may be terminated.
 3. That no liquidated damages (if applicable) shall be assessed after this date.
 4. The termination date of utility cost to the contractor.
- f. Prior to issuance of final acceptance date, the contractor shall have his authorized representatives visit the project and give full instructions to the owner's designated personnel regarding operating, maintenance, care, and adjustment of all equipment and special construction elements. In addition, the contractor shall provide the owner a complete instructional video (media format acceptable to the owner) on the operation, maintenance, care, and adjustment of all equipment and special construction elements.

ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Any work, materials, fabricated items or other parts of the work which have been condemned or declared not in accordance with the contract by the designer shall be promptly removed from the work site by the contractor, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the owner. Work or property of other contractors or the owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the contractor whose work is faulty.
- b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the designer, and shall make satisfactory progress, as determined by the designer, until completed.
- c. Should the contractor fail to proceed with the required corrections, then the owner may complete the work in accordance with the provisions of Article 28.

ARTICLE 27 - CORRECTION OF WORK AFTER FINAL PAYMENT

See Article 35, Performance Bond and Payment Bond, and Article 42, Guarantee. Neither the final certificate, final payment, occupancy of the premises by the owner, nor any provision of the contract, nor any other act or instrument of the owner, nor the designer, shall relieve the contractor from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. The contractor shall correct or make good any defects due thereto and repair any damage resulting therefrom which may appear during the guarantee period following final acceptance of the work except as stated otherwise under Article 42, Guarantee. The owner will report any defects as they may appear to the contractor and establish a time limit for completion of corrections by the contractor. The owner will be the judge as to the responsibility for correction of defects.

ARTICLE 28 - OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the contractor fails to prosecute the work properly or to perform any provision of the contract, the owner, after seven (7) days' written notice sent by certified mail, return receipt requested, to the contractor from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the contractor, such action and cost of same having been first approved by the designer. Should the cost of such action of the owner exceed the amount due or to become due the contractor, then the contractor or his surety, or both, shall be liable for and shall pay to the owner the amount of said excess.

ARTICLE 29 - ANNULMENT OF CONTRACT

If the contractor fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time above specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the owner may give notice in writing, sent by certified mail, return receipt requested, to the contractor and his surety of such delay, neglect or default, specifying the same, and if the contractor within a period of seven (7) days after such notice shall not proceed in accordance therewith, then the owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the work to be done under this contract within seven (7) days after being so notified and notify the owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said contractor, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said contractor and surety. In case the expense so incurred by the owner shall be less than the sum which would have been payable under the contract, if it had been completed by said contractor, then the said contractor and surety shall be entitled to receive the difference, but in case such expense shall

exceed the sum which would have been payable under the contract, then the contractor and the surety shall be liable and shall pay to the owner the amount of said excess.

ARTICLE 30 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the contractor, or if the owner should fail or refuse to make payment on account of a certificate issued by the designer within forty-five (45) days after receipt of same, then the contractor, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the owner and the designer, may suspend operations on the work or terminate the contract.
- b. The owner shall be liable to the contractor for the cost of all materials delivered and work performed on this contract plus ten (10) percent overhead and profit and shall make such payment. The designer shall be the judge as to the correctness of such payment.

ARTICLE 31 - REQUEST FOR PAYMENT

- a. Not later than the fifth day of the month, the contractor shall submit to the designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the contractor and the designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
 1. Total of contract including change orders.
 2. Value of work completed to date.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the contractor's work has been satisfactorily completed on schedule, with approval of the owner and written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule.
 4. Less previous payments.
 5. Current amount due.
- b. The contractor, upon request of the designer, shall substantiate the request with invoices of vouchers or payrolls or other evidence.
- c. Prior to submitting the first request, the contractor shall prepare for the designer a schedule showing a breakdown of the contract price into values of the various parts of the work, so arranged as to facilitate payments to subcontractors in accordance with Article 17, Contractor and Subcontractor Relationships. The contractor(s) shall list the value of each subcontractor and supplier, identifying each minority business subcontractor and supplier as listed in Affidavit C, if applicable.
- d. When payment is made on account of stored materials and equipment, such materials must be stored on the owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials

and equipment. Such payments will be made only for materials that have been customized or fabricated specifically for this project. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs and gypsum board may not be submitted. Responsibility for such stored materials and equipment shall remain with the contractor regardless of ownership title. Such stored materials and equipment shall not be removed from the owner's property. Should the space for storage on-site be limited, the contractor, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the contractor desire to include any such materials or equipment in his application for payment, they must be stored in the name of the owner in an independent, licensed, bonded warehouse approved by the designer and the owner and located as close to the site as possible. The warehouse selected must be approved by the contractor's bonding and insurance companies; the material to be paid for shall be assigned to the owner and shall be inspected by the designer. Upon approval by the designer and owner of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the contractor. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the designer and the owner prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the State absolute right to possession of the materials at anytime. Bond, security and insurance protection shall continue to be the responsibility of the contractor(s).

- e. On projects requiring a Critical Path Method (CPM) construction schedule, the project expediter will submit with each monthly pay application to the designer a current CPM schedule in a computerized precedence network format on a compact disc. The schedule will include all construction activities to be accomplished during the project to be properly sequenced and coordinated with elements of the work. The schedule shall be assembled from input presented and mutually coordinated by all the contractors (and/or subcontractors) and integrated into a single, overall schedule. The project expediter will show all the scheduled work activities, including their subcontractors, and the sequence and interdependence (predecessors and successors) of the activities. The schedule shall show the total project duration including milestone dates. The critical path shall be clearly indicated. The schedule shall be in such a format that it can be read (imported) in Microsoft Project or Primavera P6. Failure to submit the construction schedule on compact disc media in an acceptable format will result in the pay application being denied.
- f. In the event of beneficial occupancy, retainage of funds due the contractor(s) may be reduced with the approval of the owner to an equitable amount to cover the list of items to be completed or corrected. Retainage may not be reduced to less than two and one-half (2 1/2) times the estimated value of the work to be completed or corrected. Reduction of retainage must be with the consent and approval of the contractor's bonding company.

ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- a. Within five (5) days from receipt of request for payment from the contractor, the designer shall issue and forward to the owner a certificate for payment. This certificate shall indicate the amount requested or as approved by the designer. If the certificate is not approved by the designer, he shall state in writing to the contractor and the owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the owner except:

1. Claims arising from unsettled liens or claims against the contractor.
 2. Faulty work or materials appearing after final payment.
 3. Failure of the contractor to perform the work in accordance with drawings and specifications, such failure appearing after payment.
 4. As conditioned in the performance bond and payment bond.
- c. The making and acceptance of final payment shall constitute a waiver of all claims by the contractor except those claims previously made and remaining unsettled (Article 20(c)).
- d. Prior to submitting request for final payment to the designer for approval, the contractor shall fully comply with all requirements specified in the “project closeout” section of the specifications. These requirements include but are not limited to the following:
1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, As-Built Drawings, Certificates of Inspection or Approval from agencies having jurisdiction. (The designer must approve the Manuals prior to delivery to the owner).
 2. Transfer of Required attic stock material and all keys in an organized manner.
 3. Record of Owner’s training.
 4. Resolution of any final inspection discrepancies.
 5. Granting access to contractor’s records, if owner’s internal auditors have made a request for such access pursuant to Article 52.
- e. The contractor shall forward to the designer, the final application for payment along with the following documents:
1. List of minority business subcontractors and material suppliers showing breakdown of contract amounts and total actual payments to subcontractors and material suppliers.
 2. Affidavit of Release of Liens.
 3. Affidavit of contractors of payment to material suppliers and subcontractors. (See Article 36).
 4. Consent of Surety to Final Payment.
 5. Certificates of state agencies required by state law.
- f. The designer will not authorize final payment until the work under contract has been certified by designer, certificates of compliance issued, and the contractor has complied with the closeout requirements. The designer shall forward the contractor’s final application for payment to the owner along with respective certificate(s) of compliance required by law.

ARTICLE 33 - PAYMENTS WITHHELD

- a. The designer with the approval of the owner may withhold payment for the following reasons:
 - 1. Faulty work not corrected.
 - 2. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
 - 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed.
- b. The owner may authorize the withholding of payment for the following reasons:
 - 1. Claims filed against the contractor or evidence that a claim will be filed.
 - 2. Evidence that subcontractors have not been paid.
- c. The owner may withhold all or a portion of the contractor's general conditions costs set forth in the approved schedule of values if the contractor has failed to comply with: (1) a request to access its records by the owner's internal auditors pursuant to Article 52; (2) a request for a plan of action and/or recovery schedule under Article 14j; (3) a request to provide electronic copies of contractor's baseline schedule and/or updates with all logic used to create schedules in the original format of the scheduling software; and (4) contractor's failure to have its superintendent on the project as provided in Article 14.1 and/or as stipulated in the Supplementary General Conditions.
- d. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the contractor without cause will make owner liable for payment of interest to the contractor in accordance with G.S. 143-134.1. As provided in G.S. 143-134.1(e) the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress, defective construction not remedied, disputed work, or third party-claims filed against the owner or reasonable evidence that a third-party claim will be filed.

ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until the contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the owner. These certificates shall document that coverage afforded under the policies will not be cancelled, reduced in amount or coverages eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the owner of such alteration or cancellation. If endorsements are needed to comply with the notification or other requirements of this article copies of the endorsements shall be submitted with the certificates.

a. Worker's Compensation and Employer's Liability

The contractor shall provide and maintain, until final acceptance, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of \$100,000.

b. Public Liability and Property Damage

The contractor shall provide and maintain, until final acceptance, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury: \$500,000 per occurrence
Property Damage: \$100,000 per occurrence / \$300,000 aggregate

In lieu of limits listed above, a \$500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. **Property Insurance (Builder's Risk/ Installation Floater)**

The contractor shall purchase and maintain property insurance until final acceptance, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the owner, the contractor, the subcontractors and subcontractors in the work and shall insure against the perils of fire, wind, rain, flood, extended coverage, and vandalism and malicious mischief. If the owner is damaged by failure of the contractor to purchase or maintain such insurance, then the contractor shall bear all reasonable costs properly attributable thereto; the contractor shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. **Deductible**

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the contractor

e. **Other Insurance**

The contractor shall obtain such additional insurance as may be required by the owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. **Proof of Carriage**

The contractor shall furnish the owner with satisfactory proof of carriage of the insurance required before written approval is granted by the owner.

ARTICLE 35 - PERFORMANCE BOND AND PAYMENT BOND

- a. Each contractor shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount. Bonds shall be executed in the form bound with these specifications.

- b. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina.

ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the contractor on account of the contract shall not become due until the contractor has furnished to the owner through the designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work in connection with his contract have been satisfied, and that no claims or liens exist against the contractor in connection with this contract. In the event that the contractor cannot obtain similar affidavits from subcontractors to protect the contractor and the owner from possible liens or claims against the subcontractor, the contractor shall state in his affidavit that no claims or liens exist against any subcontractor to the best of his (the contractor's) knowledge, and if any appear afterward, the contractor shall save the owner harmless.

ARTICLE 37 - ASSIGNMENTS

The contractor shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the contractor under the contract may be assigned.

ARTICLE 38 - USE OF PREMISES

- a. The contractor(s) shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the designer and owner and shall not exceed those established limits in his operations.
- b. The contractor(s) shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The contractor(s) shall enforce the designer's and owner's instructions regarding signs, advertisements, fires and smoking.
- d. No firearms, any type of alcoholic beverages, or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 39 - CUTTING, PATCHING AND DIGGING

- a. The contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefor.
- c. No contractor shall endanger any work of another contractor by cutting, digging or other means. No contractor shall cut or alter the work of any other contractor without the consent of the designer and the affected contractor(s).

ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

- a. The contractor shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer and other utility services which may be necessary and required for completion of the project including all utilities required for testing, cleaning, balancing and sterilization of designated plumbing, mechanical and electrical systems. Any permanent meters installed shall be listed in the contractor's name until work has a final acceptance. The contractor will be solely responsible for all utility costs prior to final acceptance unless stipulated otherwise in the project specifications. The contractor shall contact all affected utility companies prior to bid to determine their requirements to provide temporary and permanent service and include all costs associated with providing those services in their bid unless otherwise stipulated. Coordination of the work of the utility companies during construction is the sole responsibility of the contractor.
- b. Meters shall be relisted in the owner's name on the day following final acceptance of the work, and the owner shall pay for services used after that date.
- c. The owner shall be reimbursed for all metered utility charges after the meter is relisted in the owner's name and prior to completion and acceptance of the work of **all** contractors. Reimbursement shall be made by the contractor whose work has not been completed and accepted. If the work of two or more contractors has not been completed and accepted, reimbursement to the owner shall be paid by the contractors involved on the basis of assessments by the designer.
- d. Prior to the operation of permanent systems, the General Contractor will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- e. All contractors shall have the permanent building systems in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and electrical equipment rooms), and hardware are installed; and other openings have protection which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the contractor(s), the designer and the owner. Use of the equipment in this manner shall be subject to the approval of the designer and owner and shall in no way affect the warranty requirements of the contractor(s).
- f. The electrical contractor shall have the building's permanent power wiring distribution system in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- g. The electrical contractor shall have the building's permanent lighting system ready at the time the general contractor begins interior painting and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- h. Each prime contractor shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
 1. Prior to acceptance of work by the State Construction Office and owner, each contractor shall remove and replace any parts of the permanent building systems damaged through use during construction.

2. Temporary filters as recommended by the equipment manufacturer in order to keep the equipment and ductwork clean and free of dust and debris shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the owner's acceptance of the work.
3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing operations are creating dust in excess of what would be considered normal if the building were occupied.
4. It shall be understood that any warranty on equipment presented to the owner shall extend from the day of final acceptance by the owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the contractor whose system is utilized.
5. The electrical contractor shall have all lamps in proper working condition at the time of final project acceptance.
 - i. The General Contractor shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
 - j. The General Contractor shall, if required by the Supplementary General Conditions and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the designer so direct.
 - k. On multi-story construction projects, the General Contractor shall provide temporary elevators, lifts, or other special equipment for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall be included in the General Contractor's bid.
 - l. The General Contractor will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered with black letters on white background. The sign shall bear the name of the project, and the names of prime contractors on the project, and the name of the designer and consultants. Directional signs may be erected on the owner's property subject to approval of the owner with respect to size, style and location of such directional signs. Such signs may bear the name of the contractor and a directional symbol. No other signs will be permitted except by permission of the owner.

ARTICLE 41 - CLEANING UP

- a. The contractors shall keep the building and surrounding area reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the designer or General Contractor. The General Contractor shall provide an on site refuse container(s) for the use of all contractors. Each contractor shall remove their rubbish and debris from the building on a daily basis. The General Contractor shall broom clean the building as required to minimize dust and dirt accumulation.
- b. The General Contractor shall provide and maintain suitable all-weather access to the building.

- c. Before final inspection and acceptance of the building, each contractor shall clean his portion of the work, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the owner, with no cleaning required by the owner.

ARTICLE 42 - GUARANTEE

- a. The contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the work or beneficial occupancy; and shall replace such defective materials or workmanship without cost to the owner.
- b. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.
- c. Additionally, the owner may bring an action for latent defects caused by the negligence of the contractor which is hidden or not readily apparent to the owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.
- d. Guarantees for roof, equipment, materials, and supplies shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

ARTICLE 43 - CODES AND STANDARDS

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina state building codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

ARTICLE 44 - INDEMNIFICATION

To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the owner, the designer and the agents, consultants and employees of the owner and designer, from and against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance or failure of performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the contractor, the contractor's subcontractor, or the agents of either the contractor or the contractor's subcontractor. Such obligation shall not be construed

to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

ARTICLE 45 - TAXES

- a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).
- b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work, and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable, and such costs shall be included in the bid proposal and contract sum.
- e. **Accounting Procedures for Refund of County Sales & Use Tax**

Amount of county sales and use tax paid per contractor's statements:

Contractors performing contracts for state agencies shall give the state agency for whose project the property was purchased a signed statement containing the information listed in G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement from the contractor setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the contractor.

Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

ARTICLE 46 - EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

ARTICLE 47 - EMPLOYMENT OF INDIVIDUALS WITH DISABILITIES

The contractors agree not to discriminate against any employee or applicant for employment because of physical or mental disabilities in regard to any position for which the employee or applicant is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with such disabilities without discrimination based upon their physical or mental disability in all employment practices.

ARTICLE 48 - ASBESTOS-CONTAINING MATERIALS (ACM)

The State of North Carolina has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the work areas that are not to be disturbed and do not create an exposure hazard. Contractors are reminded of the requirements of instructions under Instructions to Bidders and General Conditions of the Contract, titled Examination of Conditions. Statute 130A, Article 19, amended August 3, 1989, established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina. The latest edition of *Guideline Criteria for Asbestos Abatement* from the State Construction Office is to be incorporated in all asbestos abatement projects for the Capital Improvement Program.

ARTICLE 49 - MINORITY BUSINESS PARTICIPATION

GS 143-128.2 establishes a ten percent (10%) goal for participation by minority business in total value of work for each State building project. The document *Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts* including Affidavits and Appendix E are hereby incorporated and made a part of this contract.

ARTICLE 50 – CONTRACTOR EVALUATION

The Contractor's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to bid on future State capital improvement projects. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, Contractor Evaluation Procedures, is hereby incorporated and made a part of this contract. The owner may request the contractor's comments to evaluate the designer.

ARTICLE 51- GIFTS

Pursuant to General Statute 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, subcontractor, supplier, etc.) to make gifts or give favors to any State employee. This prohibition covers those vendors and contractors who: (1) have a contract with a government agency; or (2) have performed under such a contract during the past year; or (3) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review General Statute 133-32.

The contractor is prohibited from making gifts to any of the owner's employees, owner's project representatives (architect, engineers, construction manager and their employees), employees of the State Construction Office and/or any other state employees that may have any involvement, influence, responsibilities, oversight, management and/or duties that pertain to and/or relate to the construction administration, financial administration and/or disposition of claims arising from and/or relating to the contract and/or the project.

ARTICLE 52 – AUDITING – ACCESS TO PERSONS AND RECORDS

In accordance with General Statute.147-64.7, the State Auditor shall have access to the contractor's officers, employees, agents and/or other persons in control of and/or responsible for the contractor's records that relate to this contract for purposes of conducting audits under the referenced statute. The owner's internal auditors shall also have the right to access and copy the contractor's records relating to the contract and project during the term of the contract and within two years following the completion of the project/close out of the contract to verify accounts, accuracy, information, calculations and/or data affecting and/ or relating to contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for lost efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from the owner and/or the owner's project representatives.

ARTICLE 53 – NORTH CAROLINA FALSE CLAIMS ACT

The North Carolina False Claims Act (NCFCA), General Statute 1-605 through 1-618, applies to this contract. The contractor should familiarize itself with the entire NCFCA and its applicability to any requests, demands and/or claims for payment submitted to the State through the contracting university or affiliate.

The purpose of the NCFCA “is to deter persons from knowingly causing or assisting in causing the state to pay claims that are false or fraudulent and to provide remedies in the form of treble damages and civil penalties when money is obtained from the state by reason of a false or fraudulent claim” (Section 1-605[b]). A contractor's liability under NCFCA may arise from, but not be limited to: requests for payment, invoices, billing, claims for extra work, requests for change orders, requests for time extensions, claims for delay damages/extended general conditions costs, claims for lost productivity, claims for lost efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass through claims of subcontractors and/or suppliers, documentation used to support any of the foregoing requests for claims, and/or any other request for payment from the state through

the contracting state agency, institution or university. The parts of the NCFCA that are most likely to be enforced with respect to this type of contract are as follows:

- A “claim” is “[a]ny request or demand, whether under a contract or otherwise, for money or property and whether or not the State has title to the money or property that (i) is presented to an officer, employee, or agent of the State or (ii) is made by a contractor...if the money or property is to be spent or used on the State’s behalf or to advance a State program or interest and if the State government: (a) provides or has provided any portion of the money or property that is requested or demanded; or (b) will reimburse such contractor... for any portion of the money or property which is requested or demanded.” (Section 1-606(2).)
- “Knowing” and “knowingly” – whenever a person, with respect to information, does any of the following: (a) Has actual knowledge of the information; (b) Acts in deliberate ignorance of the truth or falsity of the information; and/or (c) Acts in reckless disregard of the truth or falsity of the information. (Section 1-606 (4).) Proof of specific intent to defraud is not required. (Section 1-606 (4).)
- “Material” means having a natural tendency to influence, or be capable of influencing, the payment or receipt of money or property. (Section 1-606(4).)
- Liability – “Any person who commits any of the following acts shall be liable to the State for three times the amount of damages that the State sustains because of the act of that person[:] ... (1) Knowingly presents or causes to be presented a false or fraudulent claim for payment or approval. (2) Knowingly makes, uses, or causes to be made or used, a false record or statement material to a false or fraudulent claim. (3) Conspires to commit a violation of subdivision (1), (2) ...” (Section 1-607(a)(1), (2).)
- The NCFCA shall be interpreted and construed so as to be consistent with the federal False Claims Act, 31 U.S.C. 3729, et seq., and any subsequent amendments to that act. (Section 1-616©.)

Finally, the contracting university or affiliate may refer any suspected violation of the NCFCA by the contractor to the Attorney General’s Office for investigation. Under Section 1-608(a), the Attorney General is responsible for investigating any violation of NCFCA, and may bring a civil action against the contractor under the NCFCA. The Attorney General’s investigation and any civil action relating thereto are independent and not subject to any dispute resolution provision set forth in this contract. (See Section 1-608(a).)

ARTICLE 54 – TERMINATION FOR CONVENIENCE

- a. The owner may, at any time and for any reason terminate the contractor’s services and work at the owner’s convenience. Upon receipt of such notice, the contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing orders for materials, facilities and supplies in connection with the performance of this agreement.

- b. Upon such termination, the contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this agreement; plus, (2) such other costs actually incurred by the contractor as are permitted by the prime contract and approved by the owner; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to the contractor prior to the date of the termination of this agreement. The contractor shall not be entitled to any claim or claim of lien against the owner for any additional compensation or damages in the event of such termination and payment.

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SECTION 2, DIVISION 1B
CAPITAL PROJECTS SUPPLEMENTAL GENERAL
CONDITIONS

SUPPLEMENTAL GENERAL CONDITIONS

The following modify the January 2015, 5th Edition of the **GENERAL CONDITIONS OF THE CONTRACT, STATE OF NORTH CAROLINA FORM OC-15** and supersedes them only whenever they are in conflict. Unaltered provisions of the General Conditions shall remain in effect. These modifications shall be incorporated into all **Contract Forms**.

1.1 ARTICLE 1 - DEFINITIONS

- A. The "Owner" is the State of North Carolina through the University of North Carolina at Charlotte.
- B. The "Designer" referred to herein, shall mean (Little Diversified Architectural Consultants, 615 South College Street, Suite 1600, Charlotte, North Carolina 28202).
- U. "Provide." Shall mean furnish and install complete in place, and ready for use.
- V. "Indicated" and "Shown." Shall mean as detailed, scheduled, or called for in the Contract Documents.
- CC. "Latest Edition." Shall mean the current printed document issued up to 30 calendar days prior to date of receipt of bids, unless specified otherwise.
- DD. "Quality." Shall mean the meticulous attention to the detail of installation and workmanship necessary to the assemblage of products in the highest grade of excellence by skilled craftsmen of the trade.
- EE. "Drawings" or "Plans" mean the drawings enumerated in the Contract (including all information in the Detail Manual).
- FF. "Specifications" mean this Project Manual and Addenda thereto, and this term shall include such pages as are enumerated in the Contract as applicable to the work involved.
- GG. "Supplementary Conditions", as referred to in other parts of the Project Manual, shall be the same as "Supplementary General Conditions."
- HH. Project Identification: All correspondence, reports, schedules, applications for payment, fax items, etc., shall contain formal title of project, code and item numbers, and SCO ID numbers.

1.2 ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- A. ADD to paragraph a:

All work shall be in accordance with the Contract Documents. No change therefrom shall be made without a review by the Designer. Where more detailed information is needed, or when an interpretation of the Contract Documents is needed, the Contractor, before proceeding with the work, shall refer the matter to the Designer who will furnish information or interpretation in the form of a Field Order or other written forms or drawings. If any errors, inconsistencies, or omissions in the Contract Documents are recognized by the Contractor or any member of his organization, the Contractor shall notify the Designer in writing of such error, inconsistency, or omission before proceeding with the work.

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Where compliance with two or more requirements, material or equipment, are specified and the requirements, materials or equipment, establish conflicting specifications or quality levels, the contractor is to comply with the most stringent or higher quality specification. The Designer shall be the authority for determining the highest quality specification.

Should the specifications and drawings fail to particularly describe the material or kind of goods to be used in any place, then it shall be the duty of the Contractor to make inquiry of the Designer for what is best suited. The material that would normally be used in this place to produce first quality finished work shall be considered a part of the Contract.

Shop drawings shall be legible and suitable for producing legible reproductions.

1.3 ARTICLE 3 - CLARIFICATION AND DETAIL DRAWINGS

A. ADD to paragraph a:

If, in the opinion of the Contractor work is indicated or is specified in such manner as will make it impossible to produce a first-class piece of work, or should discrepancies appear within the Contract Documents, he shall refer same to the Designer for interpretation before proceeding with work. If the Contractor fails to make such reference, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner. Where only part of the work is indicated, similar parts shall be considered repetition. Where any detail is shown and the components therefore are fully described, similar details shall be construed to require equal materials and construction.

1.4 ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

A. ADD to paragraph a:

This schedule shall be an excerpt from the CPM schedule described by the Supplementary General Conditions. This Schedule shall indicate the items, relevant specification sections, other related submittals, the date when such item will be furnished to the Architect, and the date by which Architect's review is necessary to maintain Construction Schedule. This schedule shall take into consideration the resubmission of shop drawings required to achieve acceptance of the Designer and Owner.

B. ADD to paragraph c:

The following shop drawings will take longer than 20 calendar days for review and return to the Contractor:

1. Mechanical Systems

C. ADD to paragraph d:

All shop drawings, submittals, samples, and data shall be submitted to the Designer for review according to accepted CPM schedule from Article 5 (a). After these items have been reviewed by the Designer they will be returned to the Contractor or Project Expediter. Samples and shop drawings required for evaluation of a substitution shall be submitted with the request for substitution. Shop drawings, submittals, samples, and data will not be considered by the Designer unless the submission clearly indicates that they have been checked, coordinated between Prime Subcontractors, and stamped approved by the Contractor and Fabricator or Contractor, Subcontractor, and Fabricator as the case may be. All shop drawings and catalog cuts submitted shall each receive the following stamp completed and dated by the Contractor or submitting Prime Contractor. Samples shall have the stamp affixed to a tag attached to each sample.

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**Submitted in accordance with Section
No. _____
and paragraph _____ of the specification
No. _____**

FOR SINGLE CONTRACT, AS FOLLOWS

We have checked and approved this submittal. We find it to be in accordance with the Contract Documents.

Subcontractor	Signature	Date
---------------	-----------	------

We have reviewed this submittal and find it is coordinated with the other parts of the Project.

Subcontractor	Signature	Date
---------------	-----------	------

D. ADD paragraph e:

No extension of construction time will be allowed for delay in checking shop drawings, submittals, samples or data because of the Contractor's, Subcontractor's, or Fabricator's failure to check shop drawings before submitting them to the Designer. All shop drawings shall be prepared to show how the material relates specifically to the conditions of the Project. Standard manufacturer's drawings that do not show how and where the material is to be used will not be considered. Shop drawings shall not be reproductions or portions of reproductions of the Contract documents. Coordinated shop drawings at the same scale indicating all mechanical, electrical, and plumbing shall be required between all trades. The Prime Subcontractor in a given area, as determined by the Contractor, shall submit their drawings to the other involved Subcontractors through the Prime Contractor.

E. ADD paragraph f:

The Contractor will furnish and deliver to the Owner 1 copy of each shop drawing, submittal, sample, and data which has been reviewed by the Designer and which has received a "NO EXCEPTIONS TAKEN" or a "TO BE CORRECTED AS NOTED" evaluation. The Contractor or each Prime Contractor shall deliver these to the Owner within 14 calendar days of receiving each reviewed item from the Contractor following review by the Designer, or in the case where 1 copy of a sample was submitted, within 14 calendar days of receiving advice that the sample is "NO EXCEPTIONS TAKEN" or "TO BE CORRECTED AS NOTED." Coordinate delivery with the owner's project manager. The owner shall have the option of accepting submittal copies during construction or at closeout in which case the project expeditor shall neatly store all items by division in "banker type" storage boxes or a separate file cabinet in the contractor's office facility. All stored submittals and samples shall be accessible to owner at any time during normal working hours.

F. ADD paragraph g:

After the Plumbing, HVAC, and Electrical shop drawing submittals have received a favorable review, the Contractor shall submit to the Designer for the Owner, complete operating and maintenance manuals as called for in Divisions 22, 23, and 26. These manuals shall be submitted not later than 14 calendar days before occupancy.

1. Only Contract Documents, approved Change Orders, approved Contractor submittals to the extent they are in accordance with the Contract Documents, Designer bulletin drawings, and references specifically incorporated into Contract Documents constitute authoritative description of the Work. No other documents, including Contractor generated drawings, shall be considered authoritative.

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1.5 ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

A. ADD

Also see - GENERAL REQUIREMENTS.

B. ADD to paragraph d:

These substitutions shall be made only by the Contractor and not by subcontractors or material suppliers. Necessary or required substitutions can be made after contract award per usual procedure, but only under unusual or extenuating circumstances.

1.6 ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

A. ADD paragraph e:

The Contractor shall perform the Work in accordance with The University of North Carolina at Charlotte regulations and the Preconstruction Conference Checklist (if such checklist is furnished).

1.7 ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

A. ADD:

Also see - GENERAL REQUIREMENTS.

1.8 ARTICLE 13 - INSPECTION OF THE WORK

A. ADD to paragraph c:

The Contractor shall also serve the same notice to the Owner for all such inspections or testing.

1.9 ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

A. ADD to paragraph a:

The Contractor and each of his Prime Subcontractors shall keep a Superintendent on the Project during the progress of the Work, for purposes of coordination with other Prime Subcontractors, and if required by the Owner, regardless of whether said Contractor or Prime Subcontractor has work currently in progress. Contractors are allowed to work any day of the year, except at times when the Owner may have special events which would be disrupted by Contractor's activities.

B. ADD to paragraph f:

"Unless designated otherwise, The General Contractor shall be the 'Project Expeditor'."

The Project Expeditor shall prepare daily and have available for inspection by the

Designer,

State, and Owner daily project reports. Project daily reports shall be prepared for every day of the project beginning with the date of the notice to proceed and terminating with project completion. Daily reports must also be completed for all weekends and holidays. The daily reports are to include the following items (at a minimum): Superintendents name and signature; day and date; morning and afternoon temperature; weather (clear, cloudy, rain and duration of rain); site conditions; other applicable weather conditions; crew sizes for all contractors and subcontractors on site; and major work accomplished for that day.

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C. ADD to paragraph g:

Provide CPM CONSTRUCTION SCHEDULE as stated below:

1. The Construction Schedule shall show the date when the work of each Specification Section is to begin and is to be completed, its total dollar value percent to be completed each month, and total dollar value to be completed each month. The initial schedule and subsequent updates shall be signed by the general contractor.
2. The Construction Schedule shall be a schedule in time scaled logic network in the Critical Path Method and shall depict sequence of operations mutually agreeable to the Owner, designer, and each of the Prime Sub-Contractors.
3. The dates of commencement and completion of each of the various stages of the work (including lead time activities, drawing and sample submissions, bidding, awarding subcontracts, manufacturing and shipping); delivery dates for material and equipment by separate contract in detail satisfactory to the Designer. Such Schedule shall show a complete itemized breakdown of the work, and shall include networks for all phases of the work including networks for all work to be performed by the Contractor or all Prime Sub-Contractors.
4. The schedule and all other constructions schedules shall include 1 and only 1 critical path and this critical path shall be clearly identified. The Construction Schedule shall include the early and late start dates and early and late finish dates of all activities.
5. The Contractor shall also submit a separate progress schedule listing all submittals required under the contract and when it is anticipated that each submittal will be submitted allowing 20 days for the designer's review. The separate progress schedule shall be an excerpt from the above described construction schedule.
6. The schedule shall not indicate any on-site construction activity longer than 21 consecutive calendar days or any other activity longer than 28 consecutive calendar days. Any activity with an anticipated longer duration must therefore be broken into component activities, each of which has duration of no longer than 28 calendar days. The initial schedule and subsequent updates shall be submitted in 24" X 36" color plots using a font size acceptable to the owner. Additionally, one 11" X 17" copy shall be submitted with each color plot.
7. The schedule shall also include all major milestones and all anticipated inspection, shutdowns/outages for electrical, water, natural gas, and steam tie-ins if applicable.

As a separate document, the Contractor shall submit progress report, with each Application for Payment, which shall consist of a checklist showing the date of commencement of each activity on the Construction Schedule then commenced the date of completion of those activities completed, and the approximate percentage of completion of each activity.

The Contractor shall receive the permission of the Owner to make changes to the schedule. Notwithstanding any other provisions here of to the contrary, the time of completion may be extended only by a written change order.

Whenever the Schedule of Work changes, the Construction Schedule, which is a different document from the progress report, shall be revised by the Contractor to include the Schedule revisions of all the Prime Sub-Contractors and other sub-contractors and submitted with the next Application for Payment. This revised schedule shall include all information required of the schedule prior to revisions and shall provide for completion on the Contact Completion Date.

The Contractor shall advise in advance, at least 24 hours on a weekday and at least 48 hours on weekends and legal holidays, of all schedule changes, so that any Owner inspections can be arranged. If no revised Construction Schedule is included with an Application for Payment, this lack of inclusion shall constitute a certification by each and all the Contractors that no changes in the Construction Schedule have occurred.

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Ownership of float and purpose of Schedule

1. All schedule float, slacktime, or contingency within the schedule jointly belongs to the Owner and Contractor. The Owner shall be entitled to require early completion and clean-up of certain portions of the Work. (i.e. the difference in time between the projects early completion and the required completion date and total float within the overall schedule, is not the exclusive use of either the owner or the Contractor, but is jointly owned by each and is a resource available to and shared by each of the parties as needed to meet contract milestones and the contract completion dates with the owner receiving initial benefit. The Contractor shall not sequester shared float through such strategies as extending activity duration estimates to consume available float, using preferential logic or using extensive crew/resource sequencing etc. since float time within the schedule is jointly owned, no time extensions will be granted until a delay occurs which extends the work beyond the contract completion date. Since float time within the construction schedule is jointly owned, it is acknowledged that owner caused delays on the project may be offset by Owner caused time savings (i.e., critical path submittals returned in less time than allowed by the contract, approval of substitution requests which result in a savings of time to the Contractor. In such an event, the Contractor shall not be entitled to receive a time extension until all owner caused time savings are exceeded and the contract completion date is also exceeded.

The submittal of a fully revised and acceptable construction schedule shall be a condition precedent to the processing of the second monthly payment application. As such, each of the prime Sub-Contractors have a specific obligation to each of the other Prime-Sub Contractors and to the owner to provide all necessary information and to fully cooperate with the Contractor in the development of this and all other construction schedules, including monthly updated construction schedules. All updated construction schedules shall include an updated submittal process schedule excerpted from the construction schedule.

Regardless of which submittal method the Contractor elects to use in formulating the construction schedule, an updated schedule shall be submitted to the owner 5 days prior to submittal of any monthly payment request. The submittal of the updated construction schedule, which satisfies the requirement of this article accurately reflects the status of the work, and incorporates all changes into the schedule, shall be a condition precedent to the processing of the monthly payment application. Updated schedules shall also be submitted at such other times as the Owner may direct. Upon approval of a change order or issuance of a directive to proceed with a change the approved change order shall be reflected in the next schedule update submitted by the Contractor or other update submittal approved by the Owner.

If completion of any part of the work, the delivery of equipment or materials, or submittal of any of the submittals is behind the updated construction schedule and will impact the end date of the work past the contract completion date, the Contractor, shall submit in writing, a plan acceptable to the owner for completing the work on or before the current completion date.

No extensions of time shall be granted unless the delay can be clearly demonstrated by the Contractor, on the basis of the updated construction schedule current as of the month the change is issued on the delay occurred and which delay cannot be mitigated, offset, or eliminated through such actions as revising the intended sequence of work or other means. It is recognized that any such delay which is the direct result of, and only the direct result of an owner directed change may entitle the Contractor to added compensation for efforts to maintain the schedule or for costs related to extending the schedule as a result of the owner directed change which cannot be accommodated by owner caused time savings.

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As a precedent to the release of retained funds, the Contractor shall, after completion of the work has been achieved, submit a final construction schedule which accurately reflects the manner in which the project was constructed and includes actual start and completion dates for all work activities on the construction schedule.

Should the Contractor fail or refuse to complete any portion of the work in accordance with the Construction Schedule, the Owner may perform or cause to be performed the work necessary to cause such completion, and all costs incurred by Owner and Designer shall be deducted from any monies which otherwise may become due the Contractor. Should such costs exceed monies due, the Contractor shall reimburse the Owner within 30 days of the Owner documenting the costs to the Contractor. Schedule shall be prepared by a third party scheduling consultant.

The Contractor shall anticipate that the Owner may require various changes to the work. Only those changes which also change the duration of the critical path shall entitle the Contractor to present a claim for schedule impact, acceleration, or deceleration, only to the extent of the change in the duration of the critical path. Beyond compensation given in resolution of such a claim for acceleration or deceleration.

The purpose of the Construction Schedule, and monthly updates as hereinbefore described, or as may be otherwise submitted and approved, shall be to furnish the Owner and Designer with information to indicate that the Contractor has planned the Project in sufficient detail for the Contractor to insure that its construction can be accomplished in an orderly manner and on the Contract completion date. The dollar value estimates to be included on the schedule are to assist the Owner in cash flow planning so that funds will be readily available to pay the Applications for Payment. Monthly progress reports and updates are to furnish the Owner with current status of any changes required in the original schedule which will assist the Owner in scheduling delivery and installation of any products, furnishings, etc., necessary for the operation of the facility for its intended purpose. The responsibility for construction planning and the effective efficient implementation of such, or the converse, to meet the Contract completion date, or authorized appropriate extensions therefore, are the total responsibility of the Contractor, and such responsibility shall not transfer to the Owner/Designer. Preview of the original Construction Schedule, and subsequent modifications thereto, by the Owner and/or the Designer shall be limited to the general purposes set out above. Such approval shall not operate to imply the agreement of the Owner/Designer to the Contractor's planned procedures, coordination, critical path scheduling, etc., as being appropriate or reasonable.

Contractor shall assign manpower loading for each activity of the schedule by applying the total man-hours required to complete each activity to a resource identified as "man-hours" on each activity."

If the Contractor submits an early completion baseline schedule that shows contract completion in less than 85 percent of the working days specified in these special provisions, the baseline schedule shall be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations shall be shown to a level of detail that facilitates report generation based on labor crafts and equipment classes for the Contractor and subcontractors. The Contractor shall use average composite crews to display the labor loading of on-site construction activities. The Contractor shall optimize and level labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not duplicated in concurrent activities. The time-scaled resource histograms shall show labor crafts and equipment classes to be utilized on the contract. The Engineer may review the baseline schedule activity resource allocations using Means Productivity Standards or equivalent to determine if the schedule is practicable."

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- D. ADD paragraph m:
Prior to and during the execution of the Work, the Contractor shall immediately report any error, discrepancies, conflicts, and omissions found therein to the Designer in writing and shall have the same explained or corrected by the Designer before proceeding with the Work. Any necessary changes shall be adjusted as required thereafter by Article 19 - Changes in the Work. Any work done by the Contractor or after these Conditions have been discovered, and before the Designer has either explained or made corrections, shall be corrected at the Contractor's expense. The Contractor shall coordinate all work of his Contract to produce the required finished Project in accordance with the Contract Documents. Special attention shall be given to the submission of shop drawings, samples, color charts, and requests for substitution within the specified time; furnishing the proper shop drawings to Subcontractors, and material suppliers, whose work and equipment is affected by and related thereto; and the furnishing of all information concerning location, type, and size of built-in equipment and materials and equipment utilities. This coordination is in addition to all other coordination requirements called for in the technical sections of the Project Manual.
- E. ADD paragraph n:
The Contractor shall post a sign indicating firearms are prohibited on the job site.
- F. ADD paragraph o:
Prior to issuing the 2nd Application and Certificate for Payment, the contractor shall provide in graphic format the Baseline Anticipated Cost based on both early and late start dates for the duration of the project. On a monthly basis and as part of each subsequent Application and Certificate for Payment, the contractor shall submit the Baseline Anticipated Cost graph to include the actual earned value along with an explanation of any schedule variance.
- 1.10 ARTICLE 15 - SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS
- A. ADD:
Also see DIVISION 1 - GENERAL REQUIREMENTS
- 1.11 ARTICLE 17 - CONTRACTORS AND SUBCONTRACTOR RELATIONSHIPS
- A. ADD:
The Contractor has the responsibility to insure that all product suppliers, and Prime Subcontractors, their agents and employees, adhere to the Contract Documents and that they provide all products on time.
- 1.12 ARTICLE 19 - CHANGE IN THE WORK
- A. ADD to paragraph d:
Overhead shall include all Conditions of the Contract and all general requirements such as Project management, scheduling, home office expense, layout, reproduction of Drawings and Specifications, testing and inspection, shop drawings and sample coordination, shop drawing preparation, proposal request estimating, supervision (including general and nonworking foremen) small tools and expendable items, taxes, temporary facilities and services, including access and safety provisions, "as-built" drawings, estimating general and administrative overhead, and profit. Pricing of proposal requests need to be accomplished within 20 calendar days minimum following receipt by the contractor. Upon request, the contractor shall provide the designer with documentation to substantiate labor rates.

In the event of additions and deletions of items of direct labor and/or material, the item quantities shall be algebraically summed prior to the incorporation of applicable prices, Unit Prices, and/or the overhead and profit percentage applicable.

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1.13 ARTICLE 21 - MINOR CHANGES IN THE WORK.

- A. Revise the first sentence by adding after “The Designer...” “with consultation with the Owner.”

1.14 ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSIONS OF TIME

- A. ADD to paragraph c:

After the contract completion date, the Designer shall deduct from all contractor pay applications, the liquidated damages in the amount of the daily liquidated damage rate times the number of calendar days after the contract completion date minus any previously assessed liquidated damages.

- B. ADD paragraph h:

Time:

1. The Contractor shall commence work to be performed under this agreement on a date to be specified in a written order from the designer and shall fully complete all work within (154 days) consecutive calendar days from, and including said date. For each day in excess of the above number of days, the Contractor shall pay to the Owner the sum of (TBD) as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said Contractor to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof.
2. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate or progress as will insure full completion thereof within the time specified.

1.15 ARTICLE 24 - PARTIAL UTILIZATION: BENEFICIAL OCCUPANCY.

- A. ADD paragraph e:

Unless training requirements are included in the specifications, prior to issuance of Date of Acceptance, the Contractor shall have his/her authorized representatives visit the Project and give full instructions to the Owner's designated operating and maintenance, care, and adjustment of all equipment and special construction elements.

1. In the event of Beneficial Occupancy, the Contractor shall complete all remaining work and punch list items and schedule Final Acceptance Inspection within 30 days of the date of the Beneficial Occupancy. After 30 days, additional services required of the Designer and chargeable to the Owner for extended Construction Administration shall be payable by the Contractor via deductive change order.

1.16 ARTICLE 31 - REQUEST FOR PAYMENT

- A. ADD:

After the award of the Contract, the contractor shall promptly submit to the Designer for review and Owner approval a complete schedule of values of the various parts of the work listed in the numerical order of the specifications. The schedule shall be dated and signed by the Contractor and shall include a description of the work, quantities, labor, materials, and total Contract amount for each item. Upon Owner approval of this schedule of values, the schedule shall be used as the basis for determining monthly payments and, therefore, is needed in advance of the Contractor submitting the first application and certification for payment. Plumbing, Electrical, and HVAC Prime Sub-Contracts shall be broken down in accordance with the Table of Contents for each such work. Values shall generally be of the same order of magnitude and generally shall be between \$10,000.00 and \$100,000.00. Should the schedule of values include any value for mobilization, the schedule of values shall include an equal value for demobilization.

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The Request for Payment shall be on forms described by North Carolina State Construction Manual Section 323 and similar to AIA Document G703, latest edition. The Request for Payment shall list materials and labor separately for each Section of the Project Manual. When Request for Payment includes (1) materials stored other than on the Owner's property, or, (2) if allowed by the Owner, other than within the boundaries of the State of North Carolina, request for Payment will not be considered and another Request for Payment shall be made.

Contractor or each Prime Contractor shall also attach to the application all receipts and vouchers required to verify the requested payments for stored materials. No payment made to the Contractor by the Owner shall constitute acceptance of any work or materials not in accordance with the true intent of the Contract.

The Contractor shall additionally include on each monthly Application for Payment the following statement: "We certify that the Surety for this Project has been duly notified of the amount of this request." Unless exception to pay is made by the Surety to the Designer within 4 calendar days following the date of request, it will be assumed that the Surety concurs in the payment of this application.

American Institute of Architects Document G703, if used, may generally be obtained at office supply firms or directly from the American Institute of Architects, 1735 New York Avenue, Washington, D. C. 20036.

1.17 ARTICLE 32 – CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- A. ADD to paragraph f:
- B. THE FINAL PAYMENT of retained amount due to the Contractor on account of the Contract shall not become due until the Contractor has furnished to the Owner, through the Designer, Guarantees as set forth in the General and Supplementary General Conditions including other Guarantees required by specific Sections of the Project Manual. In addition to the above, all other submissions required by other Articles and Sections of the Project Manual must be in the hands of the Designer before approval of final payment.

1.18 ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

- A. ADD to opening paragraph:

The Designer shall be named as additional insured party on all insurance policies supplied by the Contractor. Final payment will not be made until these "As-Built Drawings" are turned over to the Designer of record and reviewed and deemed complete in writing by the Designer.

1.19 ARTICLE 38 - USE OF PREMISES.

- A. Add paragraph e:

Should the Owner allow material storage outside the construction limits, the following conditions shall apply:
 1. Staging of the Contractors: Site office trailer, equipment, materials, etc. shall be inside the construction fence or where there is no fence, inside the construction limits. No open trailers or flat beds are permitted, unless otherwise authorized. All material shall be stored in an enclosed and securable vehicle. Put name of project, company name, and company phone number on all storage vehicles stored off construction site.
 2. As space is available, the Owner may allow parking of construction workers' vehicles on its property at no cost to the contractor. Vehicles found parked outside the designated area will be towed away at the contractor's expense.

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3. Contractor personnel must wear ID badges at all times when they are working at UNC Charlotte. The ID badge can either be the Contractor's ID badge or clothing indicating which contractor or subcontractor they are directly employed by.
- 1.20 ARTICLE 39 - CUTTING, PATCHING, AND DIGGING
- A. ADD:
Also see DIVISION 1 - GENERAL REQUIREMENTS
- 1.21 ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS
- A. ADD to paragraph j:
The University will provide the Contractor with access to electrical power for operating small tools, for construction lighting, for elevator testing, and for field office operations. The University will not charge the Contractor for power so consumed. The Contractor will bear all costs related to connecting to, transforming, and distributing power from the connection point. The Contractor will bear all costs related to connecting to, transforming, distributing and maintaining temporary power from the connection point.
The Contractor shall allocate power equitably. Welding equipment and other high power users must have self-contained power sources. Power outages shall be coordinated by the Contractor with the University 30 days in advance.
At the start of construction, the contractor shall enter into a Service Agreement with Piedmont Natural Gas and pay all gas utility costs until owner occupancy at which time said Service Agreement will be transferred to the owner.
- B. ADD to item l:
A shop drawing of the project identification sign must be approved by the University prior to fabrication. No directional signs will be permitted without the University's permission. Contractors are not permitted to install any sign, anywhere on the site, off the site on University property, or on any equipment on the site, without explicit written approval of the Owner. Owner to provide project sign detail.
Location of any sign shall be approved by the Owner. Should any sign be moved from its initial location, the new location shall be approved by the Owner. All signs shall be maintained by the project expeditor in first class condition throughout the Contract by repainting, repairing, and re-erecting as necessary and as required. Sign shall be fabricated as indicated on the Drawings.
- 1.22 ARTICLE 41 - CLEANING UP
- A. ADD:
Also see DIVISION 1 - GENERAL REQUIREMENTS
- 1.23 ARTICLE 42 - GUARANTEE
- A. ADD paragraph e:
ALL GUARANTEES SHALL INCLUDE LABOR AND PRODUCTS AND SHALL BE SIGNED BY THE MANUFACTURER OR SUBCONTRACTOR, AS THE CASE MAY BE, AND COUNTERSIGNED BY THE CONTRACTOR. ALL GUARANTEES SHALL BE IN ADDITION TO, AND NOT IN LIEU OF, ALL LEGISLATED GUARANTEES. ALL GUARANTEES SHALL BE ADDRESSED TO THE OWNER AND DELIVERED TO THE DESIGNER UPON COMPLETION OF THE PROJECT AND BEFORE OR WITH THE SUBMISSION OF REQUEST FOR FINAL PAYMENT.
- B. ADD paragraph f:

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In the event that the Owner considers it impractical, because of unsuitable test conditions, or some other factors, to execute simultaneous final acceptance of all equipment, portions of the installation may be certified by the Designer for the Owner's final acceptance when that portion of the system is complete and ready for operation. The decision to accept only portions of the Project rests entirely with the Owner and may only be executed by the Owner.

C. ADD paragraph g:

The Contractor shall also guarantee for a period of 24 months, unless a longer guarantee time is specifically called for in the Specification Sections, that the work covered by this Contract will be watertight and leak-proof at every point and in every area affected by this Contract, except where leaks can be attributed to damage by forces beyond his control. He shall, immediately upon notification by the Owner of water penetration, determine the source of water penetration and, at his own expense, do any work necessary to make the work covered by this Contract watertight. He shall also, at his own expense, repair or replace any other damaged material, finishes, equipment, and furnishings, damaged as a result of this water penetration to return the building to its original accepted condition.

D. ADD paragraph h:

The Contractor signing a Contract with the Owner, shall obtain and forward to the Owner any and all guarantees issued by the manufacturers specifically for certain products and systems covered under his Contract. In the event the manufacturer does not have a suitable "preprinted" warranty form" to fully cover the guarantee requirements as set forth in the Specification Section, he shall produce a warranty form patterned after those contained hereinafter which shall fully document the guarantee as set forth in the Specification Section.

E. ADD paragraph i:

In addition to the foregoing stipulations, the Contractor shall comply with all other guarantees referred to in any portion of the Contract Documents, the more stringent requirements governing.

F. ADD paragraph j:

If for any reason the Contractor cannot guarantee any part of his work using materials or construction methods which have been specified or indicated he shall notify the Designer in typewritten form before Contracts are signed, giving reasons together with the names of products and data or substitution he can guarantee. Should the Contractor fail to so notify the Designer prior to the Signing of Contract, he will be held to have agreed to guarantee all work specified or indicated.

1.24 ARTICLE 45 - TAXES.

A. ADD to paragraph e:

Contractors shall submit monthly with their request for payment, a signed statement containing the amount of sales and use tax paid by the Contractor for that particular billing period."

1.25 ARTICLE 48 – ASBESTOS CONTAINING MATERIALS (ACM).

A. ADD the following:

No asbestos containing material may be installed in this facility, including but not limited to, sprayed-on insulation, pipe insulation, floor tile, mastic adhesive, patch materials, wiring insulation, or acoustical treatment.

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END OF SECTION 01 – 02 SUPPLEMENTAL GENERAL CONDITIONS

STATE OF NORTH CAROLINA
COUNTY SALES AND USE TAX REPORT
SUMMARY TOTALS AND CERTIFICATION

CONTRACTOR: _____

Page 1 of

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
CONTRACTOR							
SUBCONTRACTOR(S)*							
COUNTY TOTAL							

* Attach subcontractor(s) report(s)

** Must balance with Detail Sheet(s)

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20____

Notary Public

My Commission Expires: _____

Seal

Signed

Print or Type Name of Above

NOTE:
This certified statement may be subject to audit.

STATE OF NORTH CAROLINA
SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____

Page 2 of _____

SUBCONTRACTOR _____

FOR PERIOD: _____

PROJECT: _____

PURCHASE DATE	VENDOR NAME	INVOICE NUMBER	TYPE OF PROPERTY	INVOICE TOTAL	COUNTY TAX PAID	COUNTY OF SALE *
				\$	\$	
				TOTAL:	\$	

* If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.

SECTION 01 10 00 - SUMMARY

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. Owner-furnished products.
 - 4. Access to site.
 - 5. Work restrictions.
 - 6. Specification and drawing conventions.

1.3 PROJECT INFORMATION

- A. Project Identification: University of North Carolina at Charlotte – Popp Martin Student Union, Student Government Office Renovations.
 - 1. Project Location: 9201 University City Boulevard, Charlotte, North Carolina 28223.
- B. Owner: University of North Carolina at Charlotte.
 - 1. Owner's Representative: Amanda Caudle.
- C. Architect: Little Diversified Architectural Consulting, Inc., 615 South College Street, Suite 1600, Charlotte, North Carolina 28202.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. Plumbing, Mechanical, Electrical and Fire Protection Engineers: McCracken & Lopez P.A., 8801 J.M. Keynes Drive, Suite 240, Charlotte, North Carolina 28262.
- E. Web-Based Project Software: Project software, Newforma, administered by Architect will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 01 31 00 "Project Management and Coordination" for requirements for using web-based Project Software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and the following:

1. An interior renovation of approximately 9,400 s.f. space at the Student Union Building of the University of North Carolina at Charlotte campus. The Work includes demolition, new ceilings, flooring, light fixtures, partitions, and MEP.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. Capital Project Guidelines: Contractor shall comply with UNC at Charlotte's Capital Project Guidelines appended to this Section.

1.5 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated on Drawings. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

- B. Owner-Furnished Products: As indicated on Drawings.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and existing and adjacent building(s) during entire construction period. Cooperate with during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's and campus day-to-day 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.
2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.7 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Refer to "Student Union Loading Dock Parking" document, attached at the end of this Section.

1.8 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of the Owner.

- B. On-Site Work Hours: Limit construction work to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
- 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 arranging for temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two 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 two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use 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 Drawings are described in detail in the Specifications. One or more of the following are used on 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.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 APPENDIX

- A. Appendix No. 1: UNCC Design and Construction Manual – Division 01A – Capital Project Guidelines
- B. Appendix No. 2: : Student Union Loading Dock Parking.

END OF SECTION 01 10 00

SECTION 2
DIVISION 01A
CAPITAL PROJECT GUIDELINES (FORMAL)

DIVISION 01A – Capital Project Guidelines (Formal)

PART 1 - SITE ACCESS AND USE OF PREMISES

1.1 CONTRACTOR USE OF PREMISES

- A. THE CONTRACTOR shall use only the following roads on campus: For work on Cameron Blvd. and vicinity, enter from Mary Alexander Rd. to Cameron Blvd. For work on JW Clay, enter from North Tryon.
1. Each Contractor must coordinate materials deliveries to the project site without recourse to University Construction Manager. Shipping documents must contain complete delivery instructions to include a site location, Contractor name, and telephone number for the delivery truck driver's use. In case of fire, medical, ambulance or safety concern dial 911.
 2. Each Contractor using a yard hydrant, wall hydrant or hose bib must use the proper key or handle. A key or handle may be borrowed from Facilities Management. Damage from misuse or abuse will be billed to the offending Contractor. Fire hydrants will not be used for water supply (case-by-case exceptions may be made by Facilities Management if no other water is available).
 3. The Contractor shall take reasonable effort to protect existing surfaces, roadways/haul routes, parking lots, finishes, and adjacent facilities from damage during construction. Prior to construction, the Contractor may initiate a Pre-Construction meeting with the Designated Representative to perform an inspection to record damaged existing conditions. Each Contractor will ensure that vehicles and equipment are not loaded beyond their rated Gross Vehicle Weight, or other load restrictions. Vehicles operating on the Campus must comply with all State weight and axle restrictions. Contractors will be held responsible for repair of damage caused by their vehicles. When hauling material consisting of any form of stone, rock, dirt, debris or concrete the material shall not be piled or placed any higher than the sides of the hauling vehicle without written authorization of the University Project Manager.
 4. If a Contractor intends to install a physical security alarm system, prior coordination must be accomplished with Public Safety.
 5. Explosive blasting generally is not allowed. In extreme rock conditions the blasting alternative may be considered. If blasting is approved, a comprehensive plan will be coordinated with UNC Charlotte staff prior to execution.
 6. All equipment must be secured when Contractor staff is not on-site. Each contractor must accept responsibility for physical security of tools, equipment, materials and other property on-site. The construction fence must be maintained and signed to prevent casual entry into the site.
 7. Contractors are allowed to work 24 hrs per day, 7 days per week, except on Saturday during spring and winter commencements, provided the general contractor's superintendent is on site. Other restrictions apply near housing areas.
 8. Each Contractor is responsible for employee conduct and behavior on Campus. Harassment, verbal abuse, and other such behavior toward students, faculty, staff, or the general public will not be tolerated. Radios and other sound sources are not allowed on the project. All employees are required to wear shirts.
 9. Each Contractor (and all Contractor employees) must comply with University Traffic Regulations and Emergency Procedures Manual. All North Carolina motor vehicle laws apply on Campus, including registration and inspection requirements. The University reserves the right to direct the route of all hauling on University property. There shall be

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- no additional payment related to the route being selected or modified by the University. Factors such as traffic disruption, soiling of street, and detriment of pavement will be considered.
10. All materials, equipment, vehicles and employee vehicles must be contained within the limits of construction. Parking is extremely limited on Campus. Vehicles shall be parked in assigned areas to be arranged with the UCM. Vehicles must display temporary parking permits which will be provided by the UCM. Vehicle operators shall comply with all traffic and parking signs. Parking on sidewalks or lawns for loading and unloading may be arranged on an individual basis, but only after coordination with the UPM or University Construction Manager.
 11. Prior to initial occupation of the site, coordinate with Facilities Management and check in at the Facilities Management office.
 12. Weapons are prohibited on Campus.
 13. Prior to any excavation at any location by any Contractor, the Contractor must coordinate with Facilities Management to establish utilities locations. A University representative in company with the Contractor's representative will locate and mark location of utilities on the ground. The Contractor remains responsible for protecting existing utilities from damage.
 14. Contractors will maintain safe pedestrian ways around the project site. Walkways and roads will not be blocked.
 15. To the extent herein described there is no charge to Contractors for University provided utilities
 16. Utilities outages must be coordinated with Facilities Management at least 7 days prior to the period of the outage. For some critical circuits, longer lead times may be necessary.
 17. All Contractors must provide all labor, materials, tools and equipment required to accomplish the work. The University will not furnish or loan anything except where contract documents so indicate. No Contractor shall use any facility beyond the limits of construction.
 18. Attachment: Contractor's Safety Guide
 19. Added items to be provided to the Contractors by the University:
 - a. Campus Telephone List
 - b. Facilities Management Telephone List
 - c. Campus Map
 - d. UNCC Emergency Procedures Manual
 - e. UNCC Traffic Regulations
 20. The Contract Documents may specifically identify certain existing materials and items which are to be delivered to the Owner. For any other materials removed in the course of the Work, the Contractor shall first offer them to the Owner; if not accepted, the Contractor shall remove them from the Project. Any materials which are paid for under the Contract, but not incorporated into the Work due to Change Orders or for other reasons, shall be similarly offered to the Owner.

PART 2 - SAFETY

2.1 CONTRACTOR'S SAFETY GUIDE

- A. General: It is University policy to provide a working, teaching, and learning environment as free as possible of recognized hazards to the safety and health of students, faculty, staff and visitors. All Contractors are required to comply with that policy. All safety, health, and fire protection rules, regulations, policies and procedures that apply to UNC Charlotte personnel shall also apply to Contractors and their employees. Prior to initiating any contractual operations, the Contractor's on-site supervisors shall become thoroughly familiar with UNC Charlotte safety rules, procedures, emergency and disaster instructions plus all applicable state and federal

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safety and health regulations. Contractor shall establish and maintain a functioning safety program including safety meetings and site inspections for the purpose of controlling unsafe acts and conditions at the work site.

- B. Please refer to webpage for contract safety program: <http://safety.uncc.edu/contractors>

2.2 UNIVERSITY SAFETY OFFICE REQUIREMENTS

- A. The following requirements have been established by the University Safety Officer:
1. In case of fire, medical, ambulance, or safety concern dial 911 (off campus line 704-687-2200).
 2. Hazard Communication notifications will be made to extension 2200.
 3. Notify UNC Charlotte of any hazardous or unusual operation.
 4. Notify UNC Charlotte of any impairment of fire protection.
 5. Barricades must be erected a safe distance (at least 6 feet) from perimeter of construction areas.
 6. A chemical spill prevention plan must be in effect.
 7. Accomplish regular removal of scrap and debris.
 8. All welding, cutting, or hot work must comply with appropriate safety standards.
 9. No parking on sidewalks except as necessary during a specific task.
 10. Designate a safety and health coordinator for the project, or assign that responsibility to the on-site superintendent.
 11. Comply with UNC Charlotte posted "No Smoking" rules.

2.3 FACILITIES MANAGEMENT DEPARTMENT SAFETY REQUIREMENTS

- A. Care shall be taken to protect all persons in the vicinity from injury and undue inconvenience. Contractor shall provide & maintain pedestrian and vehicular barricades as necessary for the situation.
- B. Construction Fences shall be constructed of continuous temporary fencing completely containing the work area. See 10.12 Quality Control plan.
- C. Barricade for temporary pedestrian walkway shall be erected with sturdy bracing and shall extend from the ground to a minimum of 48" high and shall meet all ADA requirements for barricading for the visually impaired.
- D. Continuous, plastic mesh, orange safety fencing is acceptable. If the barricade blocks an existing pedestrian sidewalk, the contractor shall properly mark an alternate route by installing and maintaining neat legible signs. "Alternate Route" signs may be required at locations outside the Construction Limits
- E. All workers and traffic control personnel shall wear "safety orange" vests or shirts while performing work in streets, parking lots, or other areas where there may be vehicular traffic.

PART 3 - MODIFICATION PROCEDURES

3.1 CUTTING, PATCHING, AND FINISHING:

- A. See General Conditions, Article 39. The repair of all damages made by cutting shall include restoring those surfaces to a state of finish equal to that when construction began, including such things as surface texture, design, and color, unless in remodeled work new finishes are called for. All such repairs shall be performed by persons trained and proficient in the particular trades involved; for example, plaster repairs by plasterers, masonry repairs by masons, tile repairs by tile setters, painting by painters, and the like. It is the intent of the Contract

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Documents that all areas requiring repairs shall be restored to a completely finished condition acceptable to the Architect and the Owner.

3.2 CUTTING AND PATCHING:

- A. All cutting required to perform the work, and install the products specified under a particular Contract or Subcontract, shall be performed under that particular Contract or Subcontract, and all patching work resulting from this cutting shall be performed under that particular Contract or Subcontract unless completely new products have been scheduled or called for. All patching work shall be by craftsmen skilled in the required work and who may already be engaged on the Project. Cutting shall be held to the minimum.

3.3 PAINTING FOR PATCHING:

- A. All patching work within previously painted areas shall be painted by that Contract or Subcontract, which caused the need for this painting, unless completely new finish or finishes have been scheduled or called for. All painting shall be by skilled painters who may already be engaged on the Project.

3.4 CUTTING OF STRUCTURAL MEMBERS:

- A. Shall not be performed without review by the Architect.

PART 4 - OVERALL PROJECT COORDINATION

4.1 GENERAL

- A. The contractor shall coordinate all work of his contract to produce the required finished project in accordance with the contract documents. Special attention shall be given to the submission of shop drawings, product data, samples, color charts, and requests for substitution within the specified time; furnishing the proper shop drawings to subcontractors, products suppliers, and separate prime contractors for divided contracts, whose work and equipment is affected by and related thereto; and the furnishing of all information concerning locations, type, and size of built-in equipment and products and equipment utilities. This coordination is in addition to all other coordination requirements called for in the technical sections of the project manual and on the drawings.

THE GENERAL CONTRACTOR shall conduct all necessary coordination meetings with the contractors to fully and effectively attain this coordination and to develop these coordination drawings.

COORDINATION DRAWINGS shall be revised, to reflect as-build conditions, by the general contractor, and reproducible mylars of these shall be given to the architect at the time of request for certificate of substantial completion.

- 4.2 COORDINATION OF GRADES: tops of access points to underground systems in unpaved area shall be adjusted as necessary to be 2" higher than surrounding finish elevations.

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4.3 GENERAL INSTALLATION REQUIREMENTS

- A. INSPECTION OF CONDITIONS: The Contractor shall require the installer of each component to inspect both the substrate to which it is to be installed and the conditions under which the work is to be performed. Do not proceed with the installation until unsatisfactory conditions have been corrected to meet the requirements of the component and its manufacturer.
- B. INSTALLATION INSTRUCTIONS: The Contractor shall perform the installation work in accordance with the Contract Documents and the manufacturer's installation instructions and recommendations, the more explicit or more stringent requirements governing.
- C. THE CONTRACTOR shall inspect materials and equipment immediately upon delivery and again prior to installation. Damaged and defective items shall be rejected and removed from the Project.
- D. THE CONTRACTOR shall provide attachment and connection devices and methods necessary for installing the work in a secure condition. Install work true to required line and levelness. Allow for expansion and building movement.
- E. VISUAL EFFECTS: The Contractor shall provide uniform joint widths in exposed work of the same material. Joints shall be arranged in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for a final decision.
- F. CONTRACTOR shall recheck measurements and dimensions before starting each installation.
- G. THE CONTRACTOR shall install each component during weather conditions and Project status that will insure the best possible results. Isolate each part of the completed construction from incompatible material to prevent deterioration.
- H. THE CONTRACTOR shall coordinate the installation of temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction work for inspection and testing.

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- 4.4 MAINTENANCE OF EXISTING SERVICES: Conduct construction operations so that heat, air conditioning, ventilation, electrical, telephone, gas, water, sanitary, storm sewer, and any other service required for the building operations, to the existing building are maintained at all times during normal working hours. Any shutdowns or interruptions shall be coordinated with and approved by the owner.

PART 5 - PROTECTION OF EXISTING WORK

- 5.1 SEE GENERAL CONDITIONS, ARTICLE 11.
- 5.2 ALL CONTRACTORS are hereby reminded and cautioned that extreme care shall be exercised to protect the existing facilities from damage during the progress of the work. Any damage that occurs shall be repaired or damaged areas removed and replaced with new materials equal to the existing and to the owner's satisfaction without additional cost.
- 5.3 The lawn in the material storage areas and elsewhere as affected by the contract shall be protected from unnecessary digging, trenching and rutting, and after completion of the work all holes, trenches, ruts, and other damage shall be filled in, graded, and made ready to receive new grassing. If grassing is included in the project, these areas shall be grassed in accordance with the requirements of section 02930. If grassing is not included in the project, these areas shall be grassed to match existing as close as possible.

PART 6 - OTHER REQUIREMENTS

- 6.1 UTILITY STANDARDS: All underground piping and utilities (both metallic and non-metallic), except copper pipe, shall have a separate copper tracer wire and non-metallic warning tape installed above the utility line.
- A. The tracer wire shall be traced for continuity prior to backfill, immediately upon completion of backfill and compaction and once again during final utility location/as-built at the end of the project. This also will include landscape irrigation mains to the points of the valves. All above ground utility features such as vaults, manholes, valves, handholds, etc to be properly labeled. Contractor shall provide an inventory of all installed outdoor utility features including type and model.
 - B. IDENTIFICATION TAPE: The 1st stage of identification shall be a buried warning tape. This tape shall provide an early warning at shallow depth excavation. The tape shall be 6" wide, and buried approximately 18" to 30" above the service pipe, but a minimum of 10" below finished grade. It shall consist of multiple layers of polyethylene with an overall thickness of 3 to 5 mils. It shall be installed continuous from valve box to valve box or manhole to manhole, and shall terminate just outside of valve box or manhole wall. The black colored lettering on the warning tape shall be abrasion resistant and be imprinted on a color-coded background that conforms to APWA color code standards. The lettering on the tape should name the utility it is protecting (i.e. Caution buried sewer line below).
 - C. TRACER WIRE: The 2nd stage of identification shall be a buried tracer wire. This tracer wire shall provide pipeline identification, be fully detectable from above grade utility locators, and be able to provide a depth reference point to top of pipe.
 - D. All pipe, including lawn irrigation lines, and metallic pipe with compression gasket fittings installed underground shall have a tracer wire installed along the length of the pipe. The wire shall be taped to the top of the pipe at a maximum of 10' intervals and not allowed to "float freely" within the backfill.

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- E. Tracer wire shall be single-conductor, 12 gauge minimum, copper single-conductor wire with type "UF" (Underground Feeder) insulation, and shall be continuous along the pipeline passing through the inside of each valve box. A #12 AWG or heavier (smaller AWG number), solid, insulated (RHW, THW, or polyethylene insulation is recommended); copper wire shall be taped to pipe at 10 foot intervals. Do not wrap wire around pipe. The wire must be one continuous, unbroken length. Coil tracer wire at meter location and street end with enough wire to extend a minimum of two feet above grade.
- 6.2 FINAL AS-BUILT SITE UTILITY SURVEY: Prior to project completion the Design Engineer shall have the as-built survey finalized by a licensed land surveyor and locating company satisfactory to the University. The locator will locate all utilities using approved methods, where the locator shall connect to the trace wire. Any problems found in the survey shall be documented to the owner and designer. The final as-built survey shall locate and inventory all utilities and also survey the existing conditions. The survey of the site shall also include 1' contours, pipe size, and depth of utility, manhole elevations, inverts, building footprint, and all aspects of the site.
- A. Preparation: Prior to utilities being buried and at completion the site utilities shall be surveyed by a survey and location company registered in North Carolina and satisfactory to the Owner.
1. Progress as-built surveys are to be done as needed.
 2. Survey shall be tied to the North Carolina State Plane Coordinate System (a.k.a. N.C. Grid).
 3. Surveys shall meet NC Standards for Positional Accuracy.
 4. Surveys shall include the following:
 - a. Provide X, Y, and Z coordinates for all newly installed utilities.
 - b. Where new utility installation occurs adjacent to or crosses exposed existing utilities, provide X, Y, Z coordinates and description of existing utilities.
 - c. Gravity Piping (storm water & sanitary sewer):
 - 1) Locate centerline of all manhole and inlet covers and grates.
 - 2) Locate all piping inverts in and out of structures, including headwall and pipe outlet structures.
 - 3) Pipe location is not necessary for gravity piping with the exception of any tee or wye connections.
 - d. Pressure Piping (water, fire, hot & chilled, and gas):
 - 1) Provide pipe locations at fifty-foot intervals along the top centerline of pipes, at all valves, tees, branches, and changes in direction.
 - e. Duct Banks:
 - 1) Provide X, Y, Z locations on top edge, both sides, of the duct bank at fifty-foot intervals, all structural connections and all changes in directions.
 - 2) Note duct bank thickness on drawings.
 - f. Telecom/Electrical Manholes:
 - 1) Dimensions to include structure width, length and depth.
 - 2) Include elevations at top and bottom of vault, top of manhole entrance and at all conduit entering and exiting the manhole.
- B. Format: Digital files to be issued through the Construction Manager to the Architect and Engineers of Record for review of compliance with specification requirements.
1. Digital files shall be provided as a CAD (*.dwg)file in GIS format.
 2. The CAD file shall be based on the NC GRID.
 3. NAD 1983 (tie to the North Carolina State Plane Coordinate System) shall be the projection delivery format.
 4. All survey points shall be clearly labeled with X, Y, and Z coordinates.
 5. All progress surveys for each utility type shall be merged into one file.
 6. If all utility types are merged into one file they shall be separated by layer.

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7. Record Survey(s) shall be submitted within 15 days of Final Acceptance.

- C. If required by the University Construction Manager the utilities may be surveyed before they are buried. If this is the case the trace wire and locator tape must still be installed to University standard. The trace wire shall be tested prior to project punch list.

6.3 FIELD ENGINEERING

- A. OWNER'S SURVEY: Based on the Owner's Survey, the Contractor shall verify all existing grades and conditions, and verify dimensions of existing construction and report any errors and inconsistencies in writing to the Architect before work is performed in the areas where errors and inconsistencies exist.

6.4 PROJECT MEETINGS (ALSO SEE GENERAL AND SUPPLEMENTAL CONDITIONS)

- A. The Contractor and each of his Prime Subcontractors or each Prime Contractor, as the case may be, shall present a written progress report for his contract work and shall recommend any constructive measures as may be appropriate.
- B. The Designer shall conduct a preconstruction conference according to SCO requirements. A standard agenda is provided at the NC State Construction Website: <http://www.nc-sco.com/forms.aspx> Note: No SCO oversight will be required for the project with the exception of electrical
- C. The Designer shall conduct Monthly Progress Meetings as described in Section 111 of the NCDOA/SCO Blue Book. The meetings shall be conducted by the Designer's Project Manager. The agenda shall include the following elements (at a minimum):
1. Distribution of a written agenda
 2. Recognition of new personnel assigned to project
 3. Confirm attendance by all contractors (circulate attendance sheet)
 4. Review minutes of previous meeting for corrections or omissions
 5. Changes in Project personnel telephone numbers or pager numbers
 6. Short Term Schedule Projections (by each contractor)
 7. Progress Report (percentage complete by each contractor)
 8. Report on HUB percentage participation on the project; calculated by dividing the contractor's HUB commitment (value) by the contractor's total contract
 9. Long Term Schedule Projections (by each contractor)
 10. Review of weather-related delays for previous month
 11. RFI's in progress
 12. Review of Bulletin Drawing Log
 13. Change Orders in Progress (Execution)
 14. Potential Change Orders
 15. Accidents
 16. UNC Charlotte Construction Manager's Comments
 17. Schedule Next Monthly Progress Meeting
- D. The Designer shall distribute written minutes of the monthly meetings within one week of the meeting. In general, the format of the minutes should include the topics listed in the agenda. Any revisions reported to the Designer, shall be entered and copies redistributed by the Designer no later than the following monthly meeting.
- E. Copies of the minutes will be made for all officials at the meetings. The Designer can deliver copies to each official's office or deliver a set to the University Construction Manager who will then distribute them on campus. Minutes should be provided to the UCM for review within five working days after the meeting.

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- F. Waste management goals and reporting will be discussed at:
 - 1. Pre Bid Meeting
 - 2. Pre-Construction Meeting
 - 3. Regular Job site Meetings

6.5 SUBMITTALS

- A. SEE GENERAL CONDITIONS and SUPPLEMENTS THERETO, the Specification Sections, and TABULATION OF SPECIFICATION SUBMITTALS AND SPECIAL REQUIREMENTS for required submittals
- B. PHOTOGRAPHS OF THE SITE: The General Contractor shall make photographs of the site showing site conditions as existing prior to the starting of any work. Photographs shall clearly show the existing site condition, and be submitted to university construction manager electronically with each photo properly identified.

6.6 QUALITY CONTROL (ALSO SEE ARTICLE 8 OF THE GENERAL CONDITIONS)

- A. TESTING LABORATORY SERVICES: A TESTING LABORATORY will be employed and paid directly by the Owner. Whenever any retesting and re-monitoring is made necessary because work performed by the Contractor is not in accordance with the requirements of the Contract Documents, the Contractor shall reimburse the Owner for the cost of this retesting and re-monitoring. Testing and monitoring shall be required for:
 - 1. Verification of foundation subsoil conditions in accordance with Division 2.
 - 2. Testing of soil compaction as specified in Division 2.
 - 3. Testing of concrete cylinders as specified in Division 3.
 - 4. Floor finishes tolerance measurements required by Division 3.

6.7 QUALITY CONTROL PLAN

- A. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the owner, and shall be responsible for all construction and construction related activities at the site.
- B. The Contractor shall have a Qualified and Competent Supervisor present whenever workers are performing work. The Supervisor shall notify the Designated Designer's Representative of the work schedule for each day prior to initiating work.

6.8 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS (SEE GENERAL CONDITIONS AND SUPPLEMENTS THERETO, ARTICLE 40.)

- A. TEMPORARY SANITARY FACILITIES: The General Contractor shall provide and maintain self-contained, chemically-treated, temporary toilets adequate for the accommodation of all persons engaged on the work. Temporary toilets shall be enclosed and weatherproof and shall be kept in sanitary condition at all times. As soon as conditions of work will allow, a temporary toilet within building shall be provided. This toilet shall be equipped with a temporary water

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closet fixture and connections to sewer. All temporary toilets shall be in accordance with the regulations of the authorities having jurisdiction.

- B. BARRIERS: Shall be provided by the General Contractor.
 - C. TEMPORARY CONSTRUCTION FENCE: A metal 2438 mm (8') high fence with locked vehicle gates and locked pedestrian gates shall be erected and maintained. Vehicle gates shall be located as close as possible to any required permanent vehicle entry to the area. Before Project final review, this temporary fence and its foundations and appurtenances shall be removed from the site, and all resulting post holes and damage and disfiguration to the site repaired to the satisfaction of the Owner and any other parties involved.
 - 1. Fencing shall be chain link fabric with posts and top rails of pipe sections and a bottom wire. Fabric shall contain a dark green mesh for screening.
 - D. TREE AND PLANT PROTECTION: Contractors are hereby reminded and cautioned that care shall be exercised to protect trees and plants which are to remain during the progress of the Project. Suitable barriers shall be provided around all trees and plants that are to remain and which are in the construction area and product handling area. All damage to such trees and plants shall be repaired; broken limbs properly and neatly pruned and painted with pruning paint; all trunk damage neatly dressed and painted with pruning paint. Any trees and plants which are excessively damaged shall be replaced in like, kind, size, and species by the Contractor at no additional cost. All work shall be by a recognized and approved nursery.
 - 1. All grading around trees and plants to remain shall be such that the root system shall not be disturbed. Earth shall not be temporarily piled around trees and plants, nor shall earth be graded to the trees and plants above the natural root depth for that particular species.
 - 2. Established trees and plants, which are in the way of construction and which are in the material handling areas, shall be removed and stored for future replanting. The services of a recognized and approved nursery shall be employed to remove the trees and plants and prepare them for storage. Removed trees and plants shall be properly balled and burlapped in accordance with their size. During the time of storage, they shall be properly watered and cared for in accordance with the instructions from the nursery. After the construction work is completed, the stored trees and plants shall be replanted, and those trees and plants not replanted shall be disposed of as directed by the Owner.
 - E. PROVIDE AND MAINTAIN SUITABLE TEMPORARY sidewalks, closed passageways, fences, or other structures required by law so as not to obstruct or interfere with traffic in public streets, alley ways, or private right-of-way. Leave an unobstructed way along public and private places for pedestrians and vehicles.
 - F. PROVIDE WALKS over and around all obstructions in public places. Maintain from the beginning of twilight, through the whole of every night, sufficient light and guards to protect persons from injury.
 - G. LEAVE ACCESS TO FIRE HYDRANTS. Should these hydrants be susceptible to damage caused by the operations of this Contract, they shall be protected by means approved by the governing authority.
- 6.9 SECURITY:
- A. Each contractor shall be responsible for security and protection to his equipment and the site-stored and installed products under his jurisdiction, at all times whether paid for by the owner or not, until the owner accepts the project.
 - B. CONDUCT CONSTRUCTION WORK so that the owner's existing building can be locked securely at all times when it is not normally opened. All temporary outside walls and barriers shall be constructed so they will be reasonably tamperproof.

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- C. CONTRACTORS shall provide identification for their vehicles and all employees on this project. Identification methods shall be approved by the owner. The contractor shall be held responsible for each of his employees wearing the identification while on the project.
 - D. Except for communication devices, no radios or other sound-emitting devices not directly associated with the work will be operated by the workers at the job site. All workers will behave in a polite manner and all workers will wear shirts and shoes when on campus. Workers are not to make any comments or gestures to any University personnel, students or guests. Workers are permitted to smoke in designated smoking areas. Workers not complying with these requirements will not be allowed to work and may be instructed to vacate the work site. If workers are restricted from working, such restriction(s) shall not alter the terms of the contract.
- 6.10 ACCESS ROADS AND PARKING AREAS:
- A. THE GENERAL CONTRACTOR shall provide and maintain for the duration of the Contract, a graded and graveled site access road for the use of himself, his Subcontractors, his product suppliers, and Prime Contractors as the case may be. Additional access ways shall be furnished and maintained to the product storage areas and the work itself. All access roads and ways shall be properly maintained for passage during all weather conditions while work is being performed.
- 6.11 TEMPORARY CONTROLS:
- A. WATER CONTROL: THE CONTRACTOR OR EACH PRIME CONTRACTOR, AS THE CASE MAY BE, SHALL PROVIDE THIS WATER CONTROL FOR ALL WORK PERFORMED UNDER THE CONTRACT OF THE CONTRACTOR OR EACH PRIME CONTRACTOR. Furnish all labor and necessary equipment and provide all necessary products for the temporary control of surface water and seepage water during construction. Furnish and operate pumps and other equipment required to keep all excavations, pits, and trenches free from water at all times. Dikes and ditches shall be constructed around excavations and elsewhere as necessary to prevent surface water from flooding the excavations or standing in areas adjacent to excavations, in work areas or in product storage areas. The Contractor shall take all necessary precautions to protect adjacent areas and properties from damage. He shall not divert water onto adjacent areas and properties at points other than that which would be considered the natural flow, prior to construction, without the expressed consent of the Owner in writing with a copy to Architect. He shall take steps to prevent the erosion of soil, earth and other material and the conduction of the eroded materials onto adjacent properties, and shall be responsible for the removal of such materials, the restoration of adjacent areas to their original condition, and at the proper time, the removal of all water control means and methods.
- 6.12 EROSION CONTROL:
- A. Temporary erosion control is specified on the drawings.
- 6.13 FIELD OFFICES AND SHEDS:
- A. LOCATION of all temporary storage sheds shall be approved by the Architect and owner.
 - B. STORAGE SHEDS shall be provided and maintained by the Contractor.
- 6.14 CONSTRUCTION CLEANING:
- A. This requirement shall be strictly enforced. The site in general and all areas in and around the Project construction shall be clear of waste at all times in order to present a clean and orderly appearance and prevent hazards to safety and health.

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- 6.15 WASTE: The general contractor shall be responsible for the collection and removal of waste on a daily basis and in a lawful manner. Burying and burning of waste on the property shall not be permitted. Washing waste down sewers or into waterways shall not be permitted. Waste shall not be allowed to accumulate and shall not be allowed to become hazards to safety and health.
- A. The General Contractor shall furnish rodent proof containers in each construction area for the workmen to deposit their garbage and similar waste. This waste shall be kept separate from all other waste and shall be so identified in order that it can be disposed of as required by local regulations. Upon evidence of pest infestation, the General Contractor shall provide extermination services as a part of the work.
- 6.16 PUBLIC STREETS AND PRIVATE WAYS:
- A. All public streets adjacent to the site and all private ways at the site shall be kept clear of waste, spilled materials and products, and wet and dry earth at all times and shall be cleaned at the end of each working day. When wet earth is encountered, it shall be cleaned from the vehicles before they leave the site and enter the streets and private ways. All by the general contractor
- B. THE REQUIREMENTS of this Article 9 do not prevent the General Contractor from entering into an agreement between him and the other Prime Contractors for the General Contractor to remove their waste.
- 6.17 FIRST AID KITS:
- A. Each Prime Contractor and each Prime Subcontractor shall provide adequate provisioned first aid kits on the Project site for personnel employed by him and for the convenience of workmen employed by their Sub-subcontractors.
- 6.18 MATERIAL AND EQUIPMENT (SEE GENERAL CONDITIONS, ARTICLE 8).
- A. NEITHER THE OWNER NOR THE ARCHITECT WILL BE RESPONSIBLE FOR ANY ORAL INSTRUCTIONS BY OR ANY WRITTEN CONFIRMATIONS OF ANY ORAL INSTRUCTIONS FROM THE CONTRACTOR, SUBCONTRACTOR, PRODUCT SUPPLIERS, ETC.
- 6.19 STORAGE AND PROTECTION:
- A. All products both stored and installed, shall be properly stored and protected from damage in accordance with the type of product and its manufacturer's recommendations

PART 7 - CONTRACT CLOSEOUT

- 7.1 See general conditions and supplements thereto and specification sections for document submittals, demonstrations, written instructions, personnel instructions, and any other special requirements.
- A. PROJECT RECORD DRAWINGS: Shall be furnished to the Architect with each application for payment and at time of closeout. Project record drawings shall meet North Carolina Department of Administration Standards of the most current North Carolina Construction Manual.
- B. THE GENERAL CONTRACTOR shall file one (1) complete set of Contract Drawings in his field office. Each Prime Contractor and each Prime Subcontractor, as the case may be, shall fully and accurately note in red on this set any and all changes and deviations in the Project from that originally indicated on the drawings, as required by change orders, bulletin drawings, addenda, alternates, products, equipment, and methods of construction. All utility services and

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other concealed work which are built into walls, floor slabs, roof slabs, below slabs on grade, and in general unexposed shall be accurately located to avoid damage to them in case a change or renovation takes place at some future date. All changes in dimensions, elevations, location of building components and equipment, and the location of any existing work which are different from that originally shown shall be indicated on these drawings. A copy of these, showing the work for which payment is requested shall be provided with each application for payment.

- C. UPON COMPLETION of construction, the Contractors shall each furnish a copy of surveys by a N.C. Registered Land Surveyor showing the final and accurate location of all new underground utilities each has installed giving spot elevations of the utilities at 30'-0" intervals maximum. All encountered existing underground utilities shall also be noted on the site plan if their location, type, or elevation is different from that indicated on the Contract Drawings or if the utility is not indicate don the Contract Drawings. Further, the survey provided by the General Contractor shall accurately locate the building and shall give as built contours of the site.
- D. AT THE CONCLUSION OF THE PROJECT, the Contractors shall turn over to the University all equipment, files, logs, drawings or submittals, etc., belonging to the Owner.
- E. AT THE CONCLUSION OF THE PROJECT Shop Drawings. Other General shop drawings, not specific to UNC Charlotte may be sent in PDF format.
- F. AT THE CONCLUSION OF THE PROJECT Design manuals, warranty information, and paper documentation provided to the owner be in a digital format to facilitate storage. Acceptable file types are pdf, doc, xls, tiff, jpg, and dwg.

PART 8 - FINAL CLEANING UP

8.1 SEE GENERAL CONDITIONS, ARTICLE 41.

- A. BEFORE THE DATE OF THE PRELIMINARY REVIEW, the Work and the site shall be cleaned of all debris, boxes, cartons, crates, wrappings, etc. Only such cleaning materials and equipment absolutely required shall be allowed on the Project at this time. If approved beforehand by the Architect, other materials may be stored on the Site in designated areas in a neat and orderly manner.
- B. BEFORE THE DATE THE FINAL REVIEW is made to determine completion of the Project, in accordance with the Contract Documents, all of the Contractor's products and equipment shall be removed from the site, the Project given a thorough cleaning, and the Project made 100 percent complete and ready for the Owner's acceptance and use as intended.

END OF DIVISION



Student Union Loading Dock Parking

ALL PERSONS must check in with Loading Dock staff after parking

Staff Parking:

- Staff from the Student Union, Cone University Center, or other departments within the Student Affairs Division driving University vehicles (Vans, GEM carts or etc). Vehicles must have University Credentials on it.
- Max parking time: 1-2 hours depending on purpose

Vendor/Contractor Parking:

- Facilities Management and Shops
- Contractors/vendors that are not part of campus Facilities Management or Shops but are doing work in the Student Union
- Staff overflow if staff parking is full
- Max parking time: 4 hours
- If a vendor/contractor is staying longer or for multiple days, they should contact PATS about a campus parking pass or park in the deck. Vendor/contractor parking should be coordinated by the department contracting the work

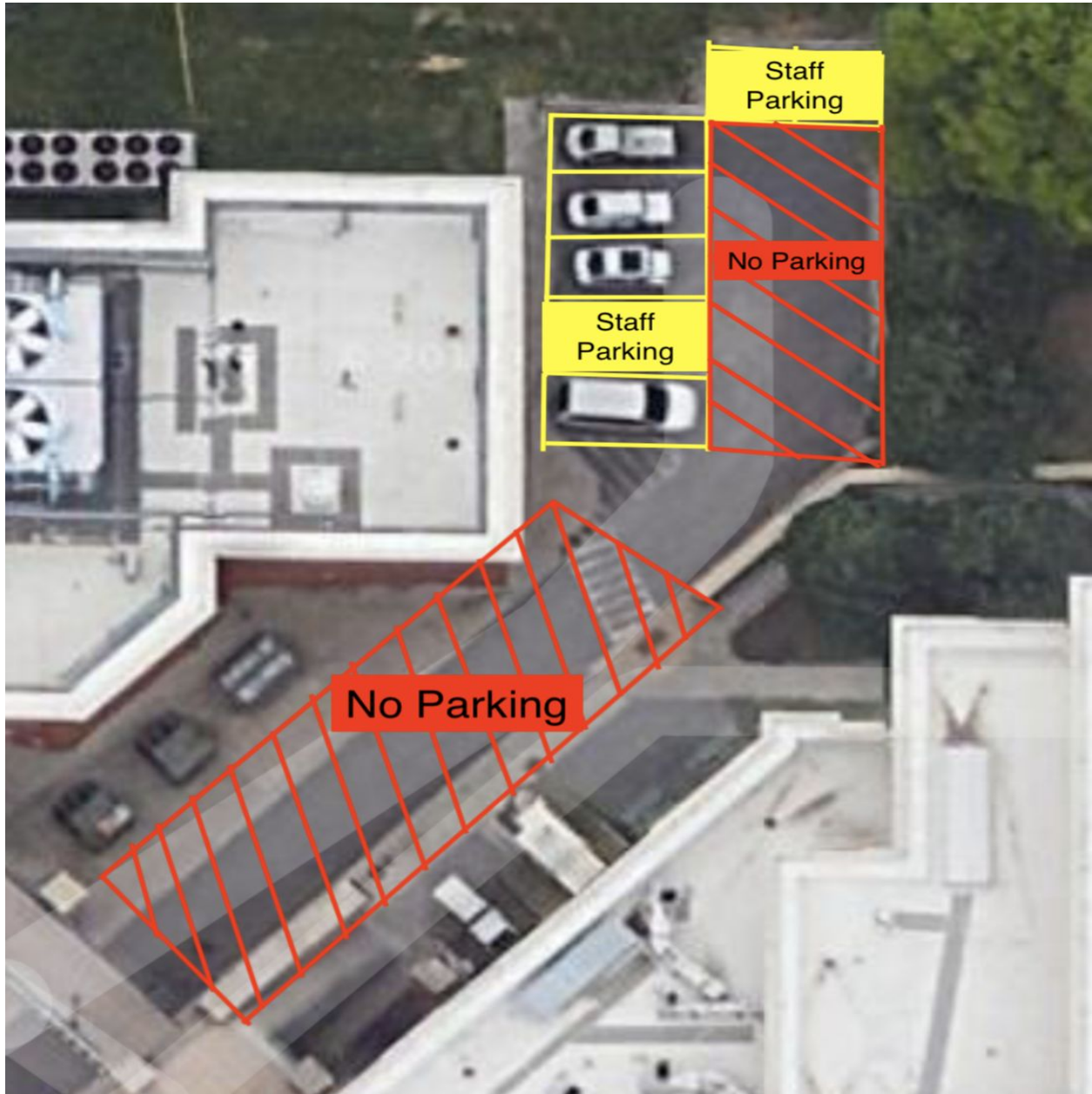
Loading/Unloading Parking:

- Standard loading/unloading vehicles
- Max parking time: 30 minutes
- Must be loading/unloading within the Student Union for a work related activity. Parking is not permitted for personal visits or activities

See maps below for parking locations:

If there are any questions, feel free to call or email the Student Union Loading Dock team: email sudockmgr@uncc.edu or phone 704-687-7691

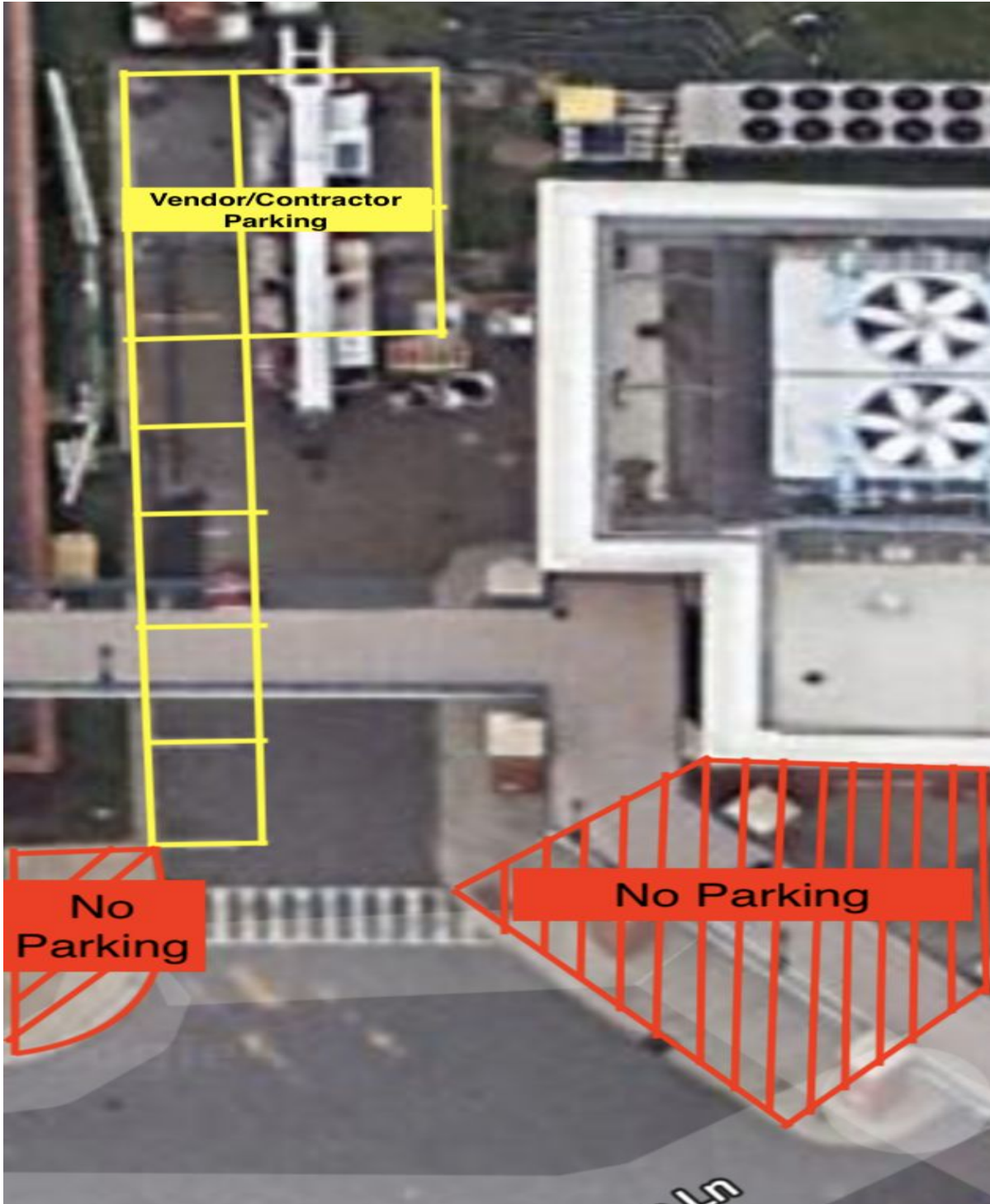
Staff Parking





UNC CHARLOTTE
Popp Martin Student Union

Vendor/Contractor Parking



Loading/Unloading Parking



SECTION 01 23 00 - ALTERNATES

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 bidders 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: Revise 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 revisions 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 – Door Side Lites and Transoms.
 - 1. Base Bid: Doors shall not have side lites and transoms.
 - 2. Alternate Bid: Provide side lites and transoms at all doors as indicated on Door Schedule on Drawings.
- B. Alternate No. 2 – Acoustic Ceilings (APC2).
 - 1. Base Bid: No acoustic ceiling system in Break/Resource 210A.
 - 2. Alternate Bid: Provide acoustic ceiling system (APC2) in Break/Resource 210A.
- C. Alternate No. 3 – New Sink in Breakroom.
 - 1. Base Bid: No new sink in breakroom.
 - 2. Alternate Bid: Provide price to provide single bowl sink at the breakroom. Provide one (1) 48 inch wide sink base cabinet in lieu of two (2) 24 inch wide cabinets, as indicated on Drawings.
- D. Alternate No. 4: Owner Preferred Alternate: Provide Owner preferred campus standard hardware alternate as specified in Section 08 71 00 “Door Hardware” and as follows:
 - 1. Locks and Cylinders: Schlage.
 - 2. Exit Devices: Von Duprin.
 - 3. Door Closers: LCN.
- E. Alternate No. 5: Vinyl Wall Covering (VWC1 and VWC2)
 - 1. Base Bid: No vinyl wall covering (VWC1 and VWC2) in resource 210 on bulkhead and demountables (demountables are in FF&E scope).
 - 2. Alternate Bid: Vinyl wall covering (VWC1 and VWC2) in resource 210 on bulkhead and demountables (demountables are in FF&E scope).
- F. Alternate No. 6: CWT1 Backsplash in break/work Room 216
 - 1. Base Bid: No CWT1 backsplash in break/work room 216.
 - 2. Alternate Bid: CWT1 backsplash in break/work room 216.

END OF SECTION 01 23 00

SECTION 01 25 00 - 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.
 - 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 to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying 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 13.1A or form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

- e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - h. Research reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. 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.
 - l. 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. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order or Architect's Supplemental Instructions for minor changes in the Work.
 - 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 a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 01 26 00 - 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.

1.3 MINOR CHANGES IN THE WORK

- A. Architect 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 .

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect 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. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal 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. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to 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 Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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 Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

END OF SECTION 01 26 00

SECTION 01 29 00 - 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 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

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 Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule. Include the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use 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. Arrange schedule of values consistent with format of AIA Document G703.

3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. 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. If required, include evidence of insurance.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial 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 Final Acceptance, and final Application for Payment involve additional requirements.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. **<Sustainable design action plans, including preliminary project materials cost data>**.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
 15. Certificates of insurance and insurance policies.
 16. Performance and payment bonds.
 17. Data needed to acquire Owner's insurance.
- I. Application for Payment at Final Acceptance: After Architect issues the Certificate of Final Acceptance, 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 Certificate(s) of Final Acceptance issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment 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. Evidence of completion and acceptance of sustainable design documentation review by GBCI for certification award.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706.
 6. AIA Document G706A.
 7. AIA Document G707.
 8. Evidence that claims have been settled.

9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Final Acceptance or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
10. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 01 31 00 - 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 coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. 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. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- 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 and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Align with scheduled project meeting. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated 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 coordination drawings 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 Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect 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 subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:

- a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: DWG, operating in Microsoft Windows operating system.
 2. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 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 Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716.

1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect'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 Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- 1.8 PROJECT WEB SITE
- A. Web-Based Project Software: Use Architect's web-based Project software site, Newforma, for purposes of hosting and managing Project communication and documentation until Final Completion.

1. Web-based Project software site includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.

1.9 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 Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 1. Attendees: Authorized representatives of Owner Architect, 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.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.

- h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for 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 Architect of scheduled meeting dates.
 - 2. Agenda: 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 requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - 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. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate 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 a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Final Acceptance.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, 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: 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 Final Acceptance and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for completing sustainable design documentation.
 - f. Requirements for preparing operations and maintenance data.
 - g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Procedures for processing Applications for Payment at Final Acceptance and for final payment.
 - k. Submittal procedures.
 - l. Construction waste management and recycling.
 - m. Coordination of separate contracts.
 - n. Owner's partial occupancy requirements.
 - o. Construction
 - p. Installation of Owner's furniture, fixtures, and equipment.
 - q. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, 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 meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: 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.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Construction waste management and recycling.
 - 13) Quality and work standards.
 - 14) Status of correction of deficient items.
 - 15) Field observations.
 - 16) Status of RFIs.
 - 17) Status of Proposal Requests.
 - 18) Pending changes.
 - 19) Status of Change Orders.
 - 20) Pending claims and disputes.
 - 21) Documentation of information for payment requests.
 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - 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 preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, 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:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Construction waste management and recycling.
 - 14) Quality and work standards.
 - 15) Status of RFIs.
 - 16) Proposal Requests.
 - 17) Change Orders.
 - 18) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - 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. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Special reports.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF file.
- B. Submittals Schedule: Arrange the following information in tabular format:
 - 1. Schedule date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Schedule date for Architect's final release or approval.
- C. Startup construction schedule.
 - 1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of 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 each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
 - 3. Total Float Report: List of activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at monthly intervals.
- H. Material Location Reports: Submit at monthly intervals.
- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Unusual Event Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

1.4 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, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 30 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

- a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 1. Use Scheduling component of Project website software specified in Section 01 31 00 "Project Management and Coordination," Newforma, for current Windows operating system.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed 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.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 5. Final Acceptance: Indicate completion in advance of date established for Final Acceptance and allow time for Architect's administrative procedures necessary for certification of Final Acceptance.
 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- D. 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 Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Final Acceptance.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.

- g. Seasonal variations.
 - h. Environmental control.
 - 4. 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. Fabrication.
 - e. Deliveries.
 - f. Installation.
 - g. Tests and inspections.
 - h. Adjusting.
 - i. Curing.
 - j. Startup and placement into final use and operation.
 - 5. 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. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Final Acceptance, and final completion.
- F. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- 1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
- G. 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 Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.
- H. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
- 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.
 - I. Recovery Schedule: When periodic update indicates the Work is 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, equipment required to achieve compliance, and date by which recovery will be accomplished.
 - J. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, 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.

1.7 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
 1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 25 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 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 and inspection.
 - 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 dates.
 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 CPM schedule 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. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- 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 early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.8 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording 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. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on

and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit 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. Unusual Event Reports: 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, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 00

SECTION 01 32 33 - 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. Preconstruction photographs.
 - 2. Final completion construction photographs.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Date photograph was taken.
 - e. Description of location, vantage point, and direction.
 - f. Unique sequential identifier keyed to accompanying key plan.

1.4 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time.
- D. File Names: Name media files with date and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of excavation, commencement of demolition starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.
 - 1. Flag excavation areas and construction limits before taking construction photographs.
 - 2. Take 15 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take 20 photographs to accurately record physical conditions at start of construction.
- C. Periodic Construction Photographs: Take photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.
- D. Final Completion Construction Photographs: Take a minimum of 20 photographs after date of Substantial Completion for submission as Project Record Documents.
- E. Additional Photographs: Architect may request photographs in addition to periodic photographs specified.
 - 1. Twenty-four hours of notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.
 - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. Photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL 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:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.3 DEFINITIONS

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

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list 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 revisions to submittals noted by Architect 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 startup construction schedule. Include submittals required during the first 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.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by the Architect's Project software website, Newforma.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website, Newforma. Enter required data in web-based software site to fully identify submittal.

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect'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.
1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 10 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect, before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. 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. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Annotate each submittal to highlight where the documentation demonstrates compliance with requirements of the Specification section.
 4. 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.
 5. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 6. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. 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.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

- a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine 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.
 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 three sets of Samples. Architect will retain two Sample sets; 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.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
 2. 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.
 3. 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.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. General: Test and research reports shall be current and latest edition.
 2. 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.
 3. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 4. 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.
 5. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 6. Product Test Reports: Submit written reports indicating that 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.
 7. 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:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.

- e. Description of product.
- f. Test procedures and results.
- g. Limitations of use.

1.8 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 insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file 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.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Annotate each submittal to highlight how the submittal complies with the applicable Specification requirements. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp or annotations and will return them without action. Submittals that include information that is not requested by the Contract Documents may be returned without review.
- B. Architect will return without review submittals received from sources other than Contractor.
- C. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Reviewed.

2. Furnish as Corrected.
3. Rejected.
4. Revise and Resubmit.

- D. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- E. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 42 00 - 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 Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. 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": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- 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.
1. 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: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
14. AI - Asphalt Institute; www.asphaltinstitute.org.
15. AIA - American Institute of Architects (The); www.aia.org.
16. AISC - American Institute of Steel Construction; www.aisc.org.
17. AISI - American Iron and Steel Institute; www.steel.org.
18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.

32. ASSE - American Society of Safety Engineers (The); www.asse.org.
33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
34. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AWEA - American Wind Energy Association; www.awea.org.
37. AWI - Architectural Woodwork Institute; www.awinet.org.
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
39. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
40. AWS - American Welding Society; www.aws.org.
41. AWWA - American Water Works Association; www.awwa.org.
42. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
43. BIA - Brick Industry Association (The); www.gobrick.com.
44. BICSI - BICSI, Inc.; www.bicsi.org.
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
46. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
47. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; www.ec-central.org.
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECA).
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; www.eima.com.
75. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
76. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; www.evo-world.org.
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.

80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.
82. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarooft.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.
86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Approval Services; (See CSA).
96. ICBO - International Conference of Building Officials; (See ICC).
97. ICC - International Code Council; www.iccsafe.org.
98. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
99. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
100. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
101. IEC - International Electrotechnical Commission; www.iec.ch.
102. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
103. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
104. IESNA - Illuminating Engineering Society of North America; (See IES).
105. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
106. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
107. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
108. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
109. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
110. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
111. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
112. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
113. ISO - International Organization for Standardization; www.iso.org.
114. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
115. ITU - International Telecommunication Union; www.itu.int/home.
116. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
117. LMA - Laminating Materials Association; (See CPA).
118. LPI - Lightning Protection Institute; www.lightning.org.
119. MBMA - Metal Building Manufacturers Association; www.mbma.com.
120. MCA - Metal Construction Association; www.metalconstruction.org.
121. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA - Material Handling Industry of America; www.mhia.org.
124. MIA - Marble Institute of America; www.marble-institute.com.
125. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
126. MPI - Master Painters Institute; www.paintinfo.com.

127. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
128. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
129. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
130. NADCA - National Air Duct Cleaners Association; www.nadca.com.
131. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
132. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
133. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
134. NCMA - National Concrete Masonry Association; www.ncma.org.
135. NEBB - National Environmental Balancing Bureau; www.nebb.org.
136. NECA - National Electrical Contractors Association; www.necanet.org.
137. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
138. NEMA - National Electrical Manufacturers Association; www.nema.org.
139. NETA - InterNational Electrical Testing Association; www.netaworld.org.
140. NFHS - National Federation of State High School Associations; www.nfhs.org.
141. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
142. NFPA - NFPA International; (See NFPA).
143. NFRC - National Fenestration Rating Council; www.nfrc.org.
144. NHLA - National Hardwood Lumber Association; www.nhla.com.
145. NLGA - National Lumber Grades Authority; www.nlga.org.
146. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
147. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
148. NRCA - National Roofing Contractors Association; www.nrca.net.
149. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
151. NSPE - National Society of Professional Engineers; www.nspe.org.
152. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA - National Wood Flooring Association; www.nwfa.org.
155. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
156. PDI - Plumbing & Drainage Institute; www.pdionline.org.
157. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
158. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
159. RFCI - Resilient Floor Covering Institute; www.rfci.com.
160. RIS - Redwood Inspection Service; www.redwoodinspection.com.
161. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
162. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
163. SDI - Steel Deck Institute; www.sdi.org.
164. SDI - Steel Door Institute; www.steeldoor.org.
165. SEFA - Scientific Equipment and Furniture Association; www.sefalabs.com.
166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
167. SIA - Security Industry Association; www.siaonline.org.
168. SJI - Steel Joist Institute; www.steeljoist.org.
169. SMA - Screen Manufacturers Association; www.smainfo.org.
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
171. SMPTE - Society of Motion Picture and Television Engineers; www.smpite.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating and Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.

177. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
178. STI - Steel Tank Institute; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; www.masonrysociety.org.
187. TPI - Truss Plate Institute; www.tpinst.org.
188. TPI - Turfgrass Producers International; www.turfgrassod.org.
189. TRI - Tile Roofing Institute; www.tilerroofing.org.
190. UBC - Uniform Building Code; (See ICC).
191. UL - Underwriters Laboratories Inc.; www.ul.com.
192. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
193. USAV - USA Volleyball; www.usavolleyball.org.
194. USGBC - U.S. Green Building Council; www.usgbc.org.
195. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
196. WASTEC - Waste Equipment Technology Association; www.wastec.org.
197. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
198. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
199. WDMA - Window & Door Manufacturers Association; www.wdma.com.
200. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
201. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
202. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
203. WPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut für Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.

8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS - California Department of Health Services; (See CDPH).
4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.

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7. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry;
<http://txforests-service.tamu.edu>.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

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 engaged in the Project to use temporary services and facilities without cost.
- B. 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.
- C. 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. Implementation and Termination Schedule: Within 15 days of date established for notice to proceed, submit schedule indicating implementation and termination dates of each temporary utility.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate personnel responsible for management of fire-prevention program.
- C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.
- B. 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: Coordinate space availability, access, restrictions, and location with Owner. Coordinate restroom use and access of other services if space within a building is designated for Field Office.
- B. Common-Use Field Office: Of enough size to accommodate needs of Owner, Architect, 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 to display Project-site documents.
 - 2. Conference room of enough size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table and chairs.
 - 3. Provide drinking water.
 - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 5. Provide internet connectivity for use by project team.
 - 6. Provide projection technology for minimum of 90 inch screen size.
 - 7. Provide two workstations for use by project team.

2.3 PARKING, DELIVERIES, AND STAGING

- A. General: Comply with Owner's requirements for designated routes for project access and deliveries, parking, and staging of materials.
 - 1. Owner reserves the right to modify requirements to limit impact on campus.

2.4 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to Section 01 74 19 Construction Waste Management and Disposal for salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work and the campus. Relocate and modify facilities as required by progress of the Work and at Owner's request.
- 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.

3.3 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. 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.
- C. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- D. Sanitary Facilities: Sanitary Facilities: Coordinate access and use of sanitary facilities with Owner. If required, provide temporary toilets at location and in compliance with Owner's requirements. Provide wash facilities and drinking water for use of construction personnel.
- E. 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 according to 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.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

3.5 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.
- B. Barricades, Warning Signs, and Lights: Comply with Owner requirements and 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 Owner.
- D. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from dust, fumes, and noise.
 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated 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.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 3. Where fire-resistance-rated temporary partitions are indicated or are required by construct partitions according to the rated assembly requirements.
 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.
- E. 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; manage fire-prevention program.
 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

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 Owner, local fire department, and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 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 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, 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 Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.3 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within [seven] <Insert number> days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

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

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A. 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. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout 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 meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.

6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
 4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
 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.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

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

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 01 73 00 - EXECUTION

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. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-provided products
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.
 - 2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.6 CONFLICTING REQUIREMENTS

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

1.7 QUALITY ASSURANCE

- A. 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 Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements 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 results in increased maintenance or decreased operational life or safety.
 3. Other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 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 Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

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, use products for patching that comply with 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 Architect 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 sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
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.
- 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. 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 Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "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 Architect promptly.

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 Architect. Report lost or destroyed permanent benchmarks or control points

- promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

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.
 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- 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. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. 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 Architect.
 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.
- I. 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.

- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

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. 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.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F. 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 minimize interruption to occupied areas.
- G. 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: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable 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.
- H. 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 rehang 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 weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. 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-PROVIDED PRODUCTS UNDER SEPARATE CONTRACT

- 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. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation 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.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. 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.
- C. 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.
- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Do not burn waste materials on-site. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- G. 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.
- H. 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.
- I. Limiting Exposures: Supervise construction operations to ensure 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. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
 - C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

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SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- 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.

1.3 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 10 days of date established for the Notice of Proceed and prior to removal of existing materials.

1.4 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, the attached report. Failure to submit this information shall render the Application for Payment incomplete and shall delay payment. Include the following information:

1. In tons or cubic yards, the amount of material landfilled from the project, the identity of the landfill, the total amount of tipping fees paid at the landfill, hauling costs and copies of weight tickets.
2. For each material recycled, reused, or salvaged, the amount (in tons or cubic yards), the date removed from the project site, the receiving party, the transportation cost, the amount of money paid or received for the recycled or salvaged material, and attach the weight tickets.

1.5 QUALITY ASSURANCE

- A. Owner has established that this project shall generate the least amount of waste possible. Implement processes that generate as little waste as possible and as many of the waste materials as economically feasible shall be reused, salvaged or recycled. Owner requires the following:
 1. Use of techniques that minimize waste generation.
 2. Reuse and renovation of existing structures in lieu of demolition.
 3. Salvage of existing materials and items for reuse or resale.
 4. Reuse materials on site where possible.
 5. Recycle waste generated during the demolition and construction process.
- B. In addition to recycling, the Owner encourages the following waste reduction practices:
 1. Provide removed brick and blocks to Owner for reuse on future projects.
 2. Donate removed doors and windows to area non-profits.
 3. Non-lead plumbing fixtures and pipes may be reused on campus.
 4. Electrical fixtures and wiring may be kept for reuse on campus.
- C. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in 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.
 1. Meet with Owner's representative from the Office of Waste Reduction and Recycling and develop a Waste Management Plan for this project.
 2. Plan to include an analysis of recyclable, reuseable, and non-salvageable materials to remove from the project and will determine the most efficient way for materials to be disposed of based on the project scope.
 - a. A list of materials that will be handled based on project scope including whether materials will be salvaged and reused, recycled, or landfilled. Include materials that will be salvaged and reused within the scope of Work.
 - b. List of landfills to be utilized for waste disposal and applicable landfill tipping fees.
 - c. List of recycling or reuse facilities expected to be utilized including costs or tipping fees at facilities.

- d. Provide protection and handling of materials. Including but not limited to contamination, recycling, and disposal requirements of named facilities.
 - e. Provide a list of haulers to transport materials including self-performed hauling.
3. Owner will review draft Waste Management Plan within 10 working days and return as approved or provide comments for revisions in the plan.
 - a. Resubmit revised plan within 10 working days for Owner's approval. Once approved by Owner, plan is implemented on project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of a minimum of 50 percent by weight of total nonhazardous solid waste generated by the Work. Facilitate recycling and salvage of materials
 1. Materials that are reused in the same project can be included in this weight, as long as reuse is documented through weights or estimates.
 2. Increase recycling and decrease waste hauling and disposal cost without placing undue burden that increase labor costs.

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. Removal of debris is included in the project scope and includes costs and labor incurred.
 2. The use of campus dumpsters is prohibited.
 3. The Owner, acting through the Architect, shall retain the right to direct the disposal of salvageable and recyclable equipment.
 4. Provide certification that every practical means of recovery or salvage has been exercised.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
 1. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 2. Distribute waste management plan to everyone concerned within three days of submittal return.
 3. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
 4. Immediately report deviance from Waste Management Plan to Owner's Office of Waste Reduction & Recycling.

- C. 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 and recycled.
 2. Comply with Section 0150 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
 3. Recycling and waste areas are to be kept neat, clean, and clearly marked in order to avoid contamination of materials.
 4. Separate, store, and dispose of hazardous waste in accordance with Federal and State regulations.

3.2 DEMOLITION AND CONSTRUCTION WASTE

- A. The following is a partial list of easily recycled materials from construction and demolition. Other materials may also be deemed recyclable or reusable:

Material	Recyclable	Reusable	Legal Requirements (if any)
Aluminum cans	✓		Recycling required by law. (NC General Statute)
Brick	✓	✓	Recycling required by the University.
Cardboard	✓		Recycling required by law. (Mecklenburg County ordinance)
Carpet/floor tiles	✓	✓	
Ceiling Tiles	✓	✓	
Concrete	✓	✓	Recycling required by the University.
Glass bottles	✓		
Metal	✓	✓	White goods recycling required by law (NC General Statute)
Pallets	✓	✓	Recycling required by law. (NC General Statute)
Paper	✓		Recycling required by law. (Mecklenburg County ordinance)
Plastic Bottles	✓		Recycling required by law. (NC General Statute)
Sheetrock (unpainted)	✓		
Wood (untreated/unpainted)	✓	✓	

- B. Burning: Do not burn waste materials.

3.3 ATTACHMENTS

END OF SECTION 01 74 19

Waste Removal Reporting Form

Project Name: _____
 Job Site: _____
 Contractor Name: _____

Date: _____

1 Project Wastes Land-filled

Landfill site	Quantity - tons/pounds	Tip fee/ton	Total cost of disposal including hauling container rental tip fees	Total Cost/ton

2 Alternatives to Landfilling

Type of material	Quantity (tons)	Material handling procedure*	Destination & means of transport	Cost of handling & transportation	Expected revenue & tip fee savings	Disposal Cost

3 Means of keeping recyclables free of contamination	4 Meetings to be held to address waste management
	1. Preconstruction Meeting 2. Monthly Construction or LEED meetings

*Material handling procedure: Was the material:
 Recycled
 Reused on site
 Returned to vendor for recycling or reuse
 Other (Please specify)

**Please return completed sheet to Shannon Caveny-Cox,
 UNCC OWR&R Email: sccaveny@uncc.edu**

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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

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

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Final Acceptance: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Final Acceptance. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Final Acceptance: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Final Acceptance. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Final Acceptance.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Final Acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Final Acceptance 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

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

1.8 LIST OF INCOMPLETE ITEMS

- 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.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, 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.

1.9 SUBMITTAL OF PROJECT WARRANTIES

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

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.

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 designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.

- f. Clean exposed exterior and interior hard-surfaced 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. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - 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. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - r. Clean strainers.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

END OF SECTION 01 77 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.

1.2 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit by digital media acceptable by email to Architect.
 - 2. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 10 days before commencing demonstration and training. Architect 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 10 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. 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: Bookmark individual documents based on 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 on opening file.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 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 Architect.
 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 8. 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. 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, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

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

1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: 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.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. 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.
 - a. 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.
 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.

- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
 - F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
 - G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
 - H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
 - I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.
 - J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of maintenance manuals.
- 1.8 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
 - B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
 - C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- D. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. 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 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

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.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Submit annotated PDF electronic files of Project's drawings, including addenda and contract modifications.
- B. Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit record digital data files and three set(s) of record digital data file plots.
 - 2) Plot each drawing file, whether or not changes and additional information were recorded.
- C. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- D. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 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.

1.4 RECORD DRAWINGS

- A. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review PDF annotated record drawings with Architect.

1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications. Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

- A. Recording: Organized by Division and Specification Section Number, maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 78 39

SECTION 02 41 19 - SELECTIVE DEMOLITION

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:

1. Demolition and removal of selected portions of building or structure.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

- A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 5. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 7. Dispose of demolished items and materials promptly.

- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 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. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- B. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to 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 demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 05 50 00 - METAL FABRICATIONS

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:
 - 1. Steel framing and supports for countertops.
 - 2. Steel framing and supports for mechanical and electrical equipment.
 - 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Steel framing and supports for countertops.
 - 2. Steel framing and supports for mechanical and electrical equipment.
 - 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.

- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 91 23 "Interior Painting."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form exposed work with accurate angles and surfaces and straight edges.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- F. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- G. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- I. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Prime miscellaneous steel trim with zinc-rich primer.

2.8 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.9 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

- A. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
- B. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

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Student Government Office Renovations
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3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

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. Procedures for compliance with certain US Green Building Council's (USGBC) LEED prerequisites and credits needed for the Project to obtain LEED certification apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood blocking, cants, and nailers.
 - 2. Wood furring and grounds.
 - 3. Wood sleepers.
 - 4. Utility shelving.
 - 5. Plywood backing panels.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. SPIB: The Southern Pine Inspection Bureau.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Power-driven fasteners.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).

- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.
 - 2. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Cants.
 - 4. Furring.
 - 5. Grounds.
 - 6. Utility shelving.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine, No. 2 grade; SPIB.
 - 2. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

- B. Power-Driven Fasteners: NES NER-272.
- C. Wood Screws: ASME B18.6.1.
- D. Lag Bolts: ASME B18.2.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
 - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not

- inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- C. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- D. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- F. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- G. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
- 3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION
- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 - B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
 - C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
- 3.3 WOOD FURRING INSTALLATION
- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

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- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring horizontally at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.

END OF SECTION 06 10 00

SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

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:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
 - 5. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
2. Thermoset Decorative Panels: 8 by 10 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
3. Corner Pieces:
 - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For the following:
 1. Thermoset decorative panels.
 2. High-pressure decorative laminate.
 3. Adhesives.
- C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.
- D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.8 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Licensed participant in AWI's Quality Certification Program.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 1. Build mockups of typical architectural cabinets as shown on Drawings.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Final Acceptance.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 1. Provide certificates from AWI certification program indicating that woodwork and installation complies with requirements of grades specified.
 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.

- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
1. Basis-of-Design: Subject to compliance with requirements, provide products by the Basis-of-Design indicated or a comparable product by one of the following:
 - a. Basis-of-Design: Laminart.
 - b. Formica Corporation.
 - c. Nevamar; a Panolam Industries International, Inc. brand.
 - d. Wilsonart LLC.
- F. Laminate Cladding for Exposed Surfaces:
1. Horizontal Surfaces: Grade HGS.
 2. Postformed Surfaces: Grade HGP.
 3. Vertical Surfaces: Grade HGS.
 4. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
 5. Pattern Direction: As indicated.
- G. Materials for Semiexposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
 - b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
 2. Drawer Sides and Backs: Solid-hardwood lumber.
 3. Drawer Bottoms: Hardwood plywood.
- H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated on Finish Schedule on Drawings.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
 3. Softwood Plywood: DOC PS 1, medium-density overlay.
 4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of architectural cabinets.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E84.
1. For panels 3/4 inch thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi; modulus of elasticity, 300,000 psi; internal bond, 80 psi; and screw-holding capacity on face and edge, 250 and 225 lbf, respectively.

2. For panels 13/16 to 1-1/4 inches thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi; modulus of elasticity, 250,000 psi; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf, respectively.
- D. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E84.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.
- C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- D. Catches: Magnetic catches, BHMA A156.9, B03141.
- E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- F. Shelf Rests: BHMA A156.9, B04013; metal.
- G. Drawer Slides: BHMA A156.9.
1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer.
 - a. Type: Full extension.
 - b. Material: Epoxy-coated steel with polymer rollers.
 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
 4. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.
 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.
 6. For computer keyboard shelves, provide Grade 1.
 7. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-100.
- H. Door Locks: BHMA A156.11, E07121.
- I. Drawer Locks: BHMA A156.11, E07041.
- J. Door and Drawer Silencers: BHMA A156.16, L03011.
- K. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Doug Mockett & Company.
 - b. McMaster-Carr.
 - c. Richelieu.
 2. Color: As selected by Architect from manufacturer's full range.
- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 2. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity shall prepare and submit report of inspection.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

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- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

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SECTION 07 84 13 - PENETRATING FIRESTOPPING

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. This Section includes penetrating firestopping for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

- 1. Walls and partitions.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide penetrating firestopping that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.
 - 4. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide penetrating firestopping with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide penetrating firestopping with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - 1. Penetrations located outside wall cavities.
 - 2. Penetrations located outside fire-resistive shaft enclosures.
 - 3. Penetrations located in construction containing fire-protection-rated openings.
 - 4. Penetrating items larger than 4-inch- diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For penetrating firestopping exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For penetrating firestopping exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of penetrating firestopping product indicated.
- B. Shop Drawings: For each penetrating firestopping, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each penetrating firestopping configuration for construction and penetrating items.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular penetrating firestopping condition, submit illustration, with modifications marked, approved by penetrating firestopping manufacturer's fire-protection engineer.

1.5 INFORMATIONAL SUBMITTALS

- A. Closeout Records: Signed by installer, provide a detailed listing of actual systems with UL designations and location of each penetrating firestopping product installed.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Product Certificates: Signed by manufacturers of penetrating firestopping products certifying that products furnished comply with requirements.
- D. Product Test Reports: From a qualified testing agency indicating penetrating firestopping complies with requirements, based on comprehensive testing of current products.

1.6 CLOSEOUT SUBMITTALS

- A. Closeout Records: Signed by installer, provide a detailed listing of actual systems with UL designations and location of each penetrating firestopping product installed.

1.7 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who specializes in the installation of firestop products and has completed penetrating firestopping similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. **Source Limitations:** Obtain penetrating firestopping, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. **Fire-Test-Response Characteristics:** Provide penetrating firestopping that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestopping systems acceptable to authorities having jurisdiction.
 - 2. Penetrating firestopping are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Penetrating firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Penetrating firestopping correspond to those indicated by reference to penetrating firestopping designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
- D. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver penetrating firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for penetrating firestopping to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.9 PROJECT CONDITIONS

- A. **Environmental Limitations:** Do not install penetrating firestopping when ambient or substrate temperatures are outside limits permitted by penetrating firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.10 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetrating firestopping are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetrating firestopping.
- C. Notify Owner's inspecting agency at least seven days in advance of penetrating firestopping installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up penetrating firestopping installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M Fire Protection Products.
 - 2. Hilti Construction Chemicals, Inc.
 - 3. Specified Technologies Inc.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide penetrating firestopping that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating firestopping, under conditions of service and application, as demonstrated by penetrating firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each penetrating firestopping that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by penetrating firestopping manufacturer and approved by the qualified testing and inspecting agency for firestopping systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide penetrating firestopping containing the types of fill materials by the UL design. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetrating firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetrating firestopping to comply with written recommendations of firestopping system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetrating firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetrating firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by penetrating firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetrating firestopping from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install penetrating firestopping to comply with "Performance Requirements" Article and firestopping system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect penetrating firestopping and to prepare test reports.
 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace penetrating firestopping so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify penetrating firestopping with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each penetrating firestopping installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words: "Warning--Penetrating Firestopping --Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Penetrating firestopping designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Penetrating firestopping manufacturer's name.
 6. Installer's name.
 7. All text to be pre-printed.
 8. Labels to be installed in consistent location, in a neat and level condition.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by penetrating firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure penetrating firestopping are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated penetrating firestopping immediately and install new materials to produce penetrating firestopping complying with specified requirements.

3.7 PENETRATING FIRESTOPPING SCHEDULE (Attached)

END OF SECTION 07 84 13

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

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PENETRATION FIRESTOPPING SCHEDULE												
THIS SCHEDULE INDICATES WHICH SERIES OF UL CLASSIFIED PENETRATING FIRESTOPPING ASSEMBLIES ARE ACCEPTABLE FOR THIS PROJECT BASED ON BARRIER TYPE, BARRIER CONSTRUCTION AND PENETRANT TYPE.												
EACH SYSTEM WITHIN A GIVEN SERIES IS CLASSIFIED FOR SPECIFIC PENETRATION CONDITIONS. CONTRACTOR SHALL SELECT TPFS ASSEMBLIES THAT ARE CLASSIFIED FOR USE WITH EACH PENETRATION'S CONDITION BASED ON CRITERIA SUCH AS THE FOLLOWING:												
PENETRATION SIZE, PENETRATION SHAPE, PENETRANT SIZE(S), PENETRANT MATERIAL(S), PENETRANT QUANTITY, LOCATIONS(S) OF PENETRANT(S) WITHIN PENETRATION.												
BARRIER		FIRE STOPPING REQUIREMENTS	PENETRANT TYPE									
TYPE	BASIS OF CONSTRUCTION		NO PENETRANTS	METALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: COPPER, IRON, STEEL)	NONMETALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: PVC, CPVC, GLASS)	ELECTRICAL CABLES	CABLE TRAYS W/ELECTRICAL CABLES	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) AND 122 DEGF (50 DEGC) (NOTE 1)	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) OR ABOVE 122 DEGF (50 DEGC) (NOTE 2)	MISC ELECTRICAL PENETRATIONS (EXAMPLES: BUS DUCTS)	METAL DUCT	UL LISTED ELECTRICAL BOXES
WALL	WOOD STUDS & GYPSUM WALLBOARD	SINGLE PENETRANT	W-L-000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 8
		MULTIPLE PENETRANTS		W-L-8000 SERIES NOTE 5				W-L-8000 SERIES NOTE 5	W-L-8000 SERIES NOTE 5	N/A	N/A	N/A
		F RATING	EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)									
		ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7
WALL	METAL STUDS & GYPSUM WALLBOARD	SINGLE PENETRANT	W-L-0000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 8
		MULTIPLE PENETRANTS		W-L-8000 SERIES NOTE 5				W-L-8000 SERIES NOTE 5	W-L-8000 SERIES NOTE 5	N/A	N/A	N/A
		F RATING	EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)									
		ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7
WALL	POURED CONCRETE BLOCK OR MASONRY	SINGLE PENETRANT	W-J-0000 SERIES OR NOTE 4	C-AJ-1000 OR W-J-1000 SERIES - NOTE 10	C-AJ-2000 OR W-J-2000 SERIES - NOTE 10	C-AJ-3000 OR W-J-3000 SERIES - NOTE 10	C-AJ-4000 OR W-J-4000 SERIES - NOTE 10	C-AJ-5000 OR W-J-5000 SERIES - NOTE 10	C-AJ-5000 OR W-J-5000 SERIES - NOTE 10	C-AJ-6000 SERIES - NOTE 10	C-AJ-7000 OR W-J-7000 SERIES - NOTE 10	??
		MULTIPLE PENETRANTS		C-AJ-8000 OR W-J-8000 SERIES -- NOTE 5				C-AJ-8000 OR W-J-8000 SERIES - NOTE 5	C-AJ-8000 OR W-J-8000 SERIES - NOTE 5		C-AJ-8000 OR W-J-8000 SERIES - NOTE 5	N/A
		F RATING	EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)									
		ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7
WALL	POURED CONCRETE BLOCK OR MASONRY	SINGLE PENETRANT	NOTE 4	C-BK-1000 OR W-K-1000 SERIES	N/A	N/A	W-K-4000 SERIES	N/A	N/A	N/A	N/A	N/A
		MULTIPLE PENETRANTS		N/A				N/A	N/A		N/A	NOTE 8
		F RATING	EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)									
		ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7
FLOOR	FRAMED	SINGLE PENETRANT	NOTE 4	F-C-1000 SERIES	F-C-2000 SERIES	F-C-3000 SERIES	N/A	F-C-5000 SERIES	F-C-5000 SERIES	N/A	F-C-7000 SERIES	??
		MULTIPLE PENETRANTS		F-C-8000 SERIES NOTE 5				F-C-8000 SERIES NOTE 5	F-C-8000 SERIES NOTE 5		F-C-8000 SERIES NOTE 5	N/A
		F RATING	EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)									
		ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7

FLOOR	POURED CONCRETE	SINGLE												
		UL CLASSIFIED SYSTEM	PENETRANT MULTIPLE PENETRANTS	C-AJ-0000 SERIES, F-A-0000 SERIES OR NOTE 4	C-AJ-1000 OR F-A-1000 SERIES	C-AJ-2000 OR F-A-2000 SERIES	C-AJ-3000 OR F-A-3000 SERIES	C-AJ-4000 OR F-A-4000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-AJ-7000 OR F-A-7000 SERIES	??	NOTE 8
MAXIMUM THICKNESS OF FIVE INCHES OR LESS				C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES - NOTE 5	C-AJ-8000 OR F-A-8000 SERIES - NOTE 5			N/A	N/A	
		EQUAL TO BARRIER RATING												
		EQUAL TO F RATING (NOTE 9)												
	ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE
FLOOR	POURED CONCRETE	SINGLE												
		UL CLASSIFIED SYSTEM	PENETRANT MULTIPLE PENETRANTS	C-BJ-0000 SERIES OR NOTE 4	C-BJ-1000 OR F-B-1000 SERIES	C-BJ-2000 OR F-B-2000 SERIES	C-BJ-3000 OR F-B-3000 SERIES	C-BJ-4000 OR F-B-4000 SERIES	C-BJ-5000 OR F-B-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-BJ-7000 OR F-B-7000 SERIES	??	NOTE 8
MINIMUM THICKNESS GREATER THAN FIVE INCHES				C-BJ-8000 OR F-B-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES - NOTE 5	C-BJ-8000 OR F-B-8000 SERIES - NOTE 5			N/A	N/A	
		EQUAL TO BARRIER RATING												
		EQUAL TO F RATING (NOTE 9)												
	ADDITIONAL REQUIREMENTS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE

THIS SCHEDULE USES THE IDENTIFICATION SYSTEMS OF UNDERWRITERS LABORATORIES, INC. AS DEFINED IN THEIR "FIRE RESISTANCE DIRECTORY" AND AS USED BY MANUFACTURERS ON THEIR UL CLASSIFIED SYSTEM.

INDICATED RATINGS MAY BE EXCEEDED. "N/A" = NOT APPLICABLE

NOTES

- EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF (0DEGC) AND 122 DEGF (50 DEGC):
 - CHILLED WATER SUPPLY & RETURN DOMESTIC HOT WATER LESS THAN 122 DEGF (50 DEGC)
 - HEAT PUMP WATER SUPPLY & RETURN DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF (50 DEGC)
 - DOMESTIC COLD WATER
- EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC):
 - STEAM SUPPLY & RETURN HEATING HOT WATER SUPPLY & RETURN
 - STEAM VENT HOT-CHILLED WATER SUPPLY & RETURN
 - CONDENSATE PUMP DISCHARGE GLYCOL HEATING HOT WATER SUPPLY & RETURN
 - BOILER BLOW DOWN DOMESTIC HOT WATER SUPPLY 140 DEGF (60 DEGC)
 - CRYOGENIC VENT DOMESTIC HOT WATER RECIRCULATION 140 DEGF (60 DEGC)
- EXAMPLES OF OTHER RECESSED DEVICES:
 - MEDICAL GAS ZONE VALVES UNIT HEATERS
 - MEDICAL GAS OUTLETS FIRE FIGHTERS' PHONE
 - FIRE VALVE CABINETS FIRE EXTINGUISHER CABINET
 - FIRE HOSE CABINETS
- SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.
- WHERE APPROPRIATE MULTI-PENETRATION CLASSIFICATION IS NOT AVAILABLE; INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS.
- FOR SYSTEMS THAT OPERATE BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC), COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
 - PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.
 - DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.
- FOR PENETRATIONS PROTECTED WITH DAMPERS, PROVIDE TPFS SYSTEM APPROVED BY DAMPER MANUFACTURER.
- WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.
- WHERE PENETRANT EXITS PENETRATION ENTIRELY WITHIN THE CAVITY OF A WALL A T-RATING IS NOT REQUIRED.
- WHERE WALL THICKNESSES ARE LESS THAN 4 1/2 INCHES THICK, SUBMIT UL SYSTEM TO ACCOMMODATE.

SECTION 07 92 00 - JOINT SEALANTS

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:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Mildew-resistant joint sealants.
 - 4. Latex joint sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Dow Corning Corporation; 790.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
 - c. Pecora Corporation; 890.
 - d. Tremco Inc.; Spectrem I.
- B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 791 Silicone Weatherproofing Sealant.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2000 SilPruf.
 - c. Pecora Corporation; 864NST.
 2. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors and windows.
 - e. Control and expansion joints in ceilings and other overhead surfaces.
 - f. Other joints as indicated on Drawings.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 795.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
 - c. Pecora Corporation; Pecora 864NST.
 - d. Tremco Incorporated; Spectrem 2.

2.4 URETHANE JOINT SEALANTS

- A. Urethane, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; MasterSeal NP 2.
 - b. Pecora Corporation; Dynatred.
 - c. Sika Corporation; Joint Sealants; Sikaflex 2C NS.
 2. Joint Locations:
 - a. Horizontal traffic joints.
 - b. Building-to-pavement conditions.

2.5 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 786.
 - b. Pecora Corporation; Pecora 898.
 - c. Tremco Incorporated; Tremsil 200.
 2. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.

2.6 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF; MasterSeal NP 520
 - b. Pecora Corporation; AC-20.
 - c. Tremco Incorporated; Tremflex 834.
 2. Joint Locations:

- a. Control joints on exposed interior surfaces of exterior walls.
- b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
- c. Other joints as indicated on Drawings.

2.7 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

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:
 - 1. Interior standard hollow metal frames.

1.3 ALTERNATES

- A. The Work of this Section is affected by an Alternate. Refer to Section 01 23 00 "Alternates."

1.4 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.5 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 3. Locations of reinforcement and preparations for hardware.
 - 4. Details of each different wall opening condition.

5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.

C. Samples for Verification:

1. Fabrication: Prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - a. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

- D. Product Schedule: For hollow-metal frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.7 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.8 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door; ASSA ABLOY.
 2. Curries Company; ASSA ABLOY.
 3. Fleming Door Products Ltd.; Assa Abloy Group Company.

4. Steelcraft; an Allegion brand.

2.2 INTERIOR STANDARD STEEL FRAMES

- A. Construct hollow-metal frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.
 1. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
 2. Exposed Finish: Prime.

2.3 FRAME ANCHORS

- A. Jamb Anchors:
 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- C. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.5 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.6 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

3.2 INSTALLATION

- A. General: Install hollow-metal frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.3 CLEANING AND TOUCHUP

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

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DIVERSIFIED ARCHITECTURAL CONSULTING

SECTION 08 14 16 - FLUSH WOOD DOORS

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:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 1. Indicate dimensions and locations of mortises and holes for hardware.
 2. Indicate dimensions and locations of cutouts.
 3. Indicate requirements for veneer matching.
 4. Indicate doors to be factory finished and finish requirements.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors from single manufacturer.
- B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
- C. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Masonite Architectural Doors.
 2. Oshkosh Door Company.
 3. VT Industries.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, Grade LD-2.
 2. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- B. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - a. Finish steel edges and astragals with baked enamel same color as doors.

C. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Custom (Grade A faces).
2. Species and Cut: Match existing.
3. Match between Veneer Leaves: Match existing.
4. Assembly of Veneer Leaves on Door Faces: Match existing.
5. Exposed Vertical and Top Edges: Same species as faces or a compatible species.
6. Core: Particleboard.
7. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI conversion varnish system.
3. Staining: Match existing.
4. Effect: Open-grain finish.
5. Sheen: Match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 71 00 – DOOR HARDWARE

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. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.
- 1.4 QUALITY ASSURANCE
- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
 - B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Twenty five years for manual surface door closer bodies.
 - 3. Twenty five years for manual surface door closer bodies.
 - 4. Twenty five years for manual surface door closer bodies.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 - 4. Hinge Options: Comply with the following:

- a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

- a. Hager Companies (HA) - CB Series.
- b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.
- c. Stanley Hardware (ST) - CB Series.

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

- a. Door Controls International (DC).
- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- c. Trimco (TC).

- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

- a. Door Controls International (DC).
- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- c. Trimco (TC).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

1. Manufacturers:

- a. Schlage (SC).

- C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

- a. Lund Equipment (LU).
- b. MMF Industries (MM).
- c. Telkee (TK).

I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
2. Locks are to be non-handed and fully field reversible.

3. Manufacturers:
 - a. Schlage (SC) – ND Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.

- b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

2.8 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC8000 Series.
 - b. LCN Closers (LC) - 4040XP Series.
 - c. Norton Door Controls (NO) – 9500 Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 3. Reese Enterprises, Inc. (RE).

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 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.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Door Hardware Sets attached.

END OF SECTION 08 71 00

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HARDWARE SETSHW SET # 1.0

Hinge	TA2714	US26D	MK
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Electric Strike	8300-LBM	630	HS
1 SMART Pac Bridge Rectifier	2005M3		HS
1 Door Closer	4040XP REG	AL	LC
1 Kick Plate	K1050 8" high HVBEV CSK	US32D	RO
1 Door Stop	409/441CU	32D/26D	RO
1 Set Door Seals/Silencers	S88D/608 AS REQUIRED		PE
1 Wiring Diagram	AS REQUIRED		OT
1 ElectroLynx Harness	QC-C1500P (@ JAMBS)		MK
1 Card Reader	FURNISHED IN OTHER SECTION		OT
1 Power Supply	BPS-24 AS REQUIRED		SU

OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD RELEASES ELECTRIC STRIKE ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER.

HW SET # 2.0

Hinge	TA2714	US26D	MK
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Electric Strike	8300-LBM	630	HS
1 SMART Pac Bridge Rectifier	2005M3		HS
1 Door Closer	4040XP CUSH	AL	LC
1 Kick Plate	K1050 8" high HVBEV CSK	US32D	RO
1 Set Door Seals/Silencers	S88D/608 AS REQUIRED		PE
1 Wiring Diagram	AS REQUIRED		OT
1 ElectroLynx Harness	QC-C1500P (@ JAMBS)		MK
1 Card Reader	FURNISHED IN OTHER SECTION		OT
1 Power Supply	BPS-24 AS REQUIRED		SU

OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD RELEASES ELECTRIC STRIKE ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER.

HW SET # 3.0

Hinge	TA2714	US26D	MK
1 Electric Hinge	TA2714 x QC	US26D	MK
1 Set Auto Flush Bolts	2842/2942	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Electric Strike	8300-LBM	630	HS
1 SMART Pac Bridge Rectifier	2005M3		HS
1 Coordinator	2600 x FILLER BAR x MTG BRKTS	Black	RO
2 Door Closer	4040XP CUSH	AL	LC
2 Kick Plate	K1050 8" high HVBEV CSK	US32D	RO

1 Set Door Seals/Silencers	S88D/608 AS REQUIRED	PE
1 ElectroLynx Harness	QC-C1500P (@ JAMBS)	MK
1 ElectroLynx Harness	QC-C000 x LAR	MK
1 Card Reader	FURNISHED IN OTHER SECTION	OT
1 Power Supply	BPS-24 AS REQUIRED	SU

OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD RELEASES ELECTRIC STRIKE ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER.

HW SET # 4.0

Hinge	TA2714	US26D	MK
1 Office Lock	ND50 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Door Stop	409/441CU	32D/26D	RO
3 Silencer	608		RO

HW SET # 5.0

Hinge	TA2714	US26D	MK
1 Classroom Lock	ND70 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Door Stop	409/441CU	32D/26D	RO
3 Silencer	608		RO

HW SET # 6.0

Hinge	TA2714	US26D	MK
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Door Closer	4040XP REG	AL	LC
1 Kick Plate	K1050 8" high HVBEV CSK	US32D	RO
1 Door Stop	409/441CU	32D/26D	RO
1 Set Door Seals/Silencers	S88D/608 AS REQUIRED		PE

HW SET # 6.1

Hinge	TA2714	US26D	MK
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Overhead Stop	10-X36	630	RF
3 Silencer	608		RO

HW SET # 7.0

Hinge	T4A3786	US26D	MK
1 Storeroom Lock	ND80 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Door Closer	4040XP EDA	AL	LC
1 Kick Plate	K1050 8" high HVBEV CSK	US32D	RO
1 Wall Stop	409	US32D	RO
1 Set Door Seals/Silencers	S88D/608 AS REQUIRED		PE

NOTE: DOOR TO SWING 180 DEGREES.

HW SET # 8.0

1 Office Lock	ND50 P D RHO x TEMP CYL	626	SC
1 Cylinder	AS REQUIRED/MATCH EXISTING	626	SC
1 Door Stop	409/441CU	32D/26D	RO

NOTE: BALANCE OF HARDWARE FURNISHED BY DEMOUNTABLE PARTITION SUPPLIER.

MANUFACTURERS ABBREVIATIONS:

1. MK - McKinney
2. RO - Rockwood
3. SC - Schlage
4. HS - HES
5. LC - LCN Closers
6. PE - Pemko
7. OT - OTHER
8. SU – Securitron

END OF SECTION 08 71 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



January 24, 2020

08 71 00 - 4

SECTION 08 80 00 - GLAZING

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:
 - 1. Glass for doors, interior borrowed lites, and hollow-metal framing.
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

1.5 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.6 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

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. Review temporary protection requirements for glazing during and after installation.

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For glass.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Guardian Industries.
2. Viracon, Inc.
3. Vitro Architectural Glass.

- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
1. Minimum Glass Thickness for Exterior Lites: 6 mm.
- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.3 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. Neoprene, ASTM C 864.
 2. Silicone, ASTM C 1115.

3. Thermoplastic polyolefin rubber, ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.
2. Silicone.
3. Thermoplastic polyolefin rubber.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.6 GLAZING TAPES

A. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 MONOLITHIC GLASS SCHEDULE

- A. Glass Type: Clear fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

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:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For partitions requiring seismic bracing, submit coordinated set of partition anchorage drawings prior to installation to include the following:
 - 1. Description, layout, and location of items to be anchored or braced with anchorage or braced points noted and dimensioned.
 - 2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, and welds clearly identified.
 - 3. Numerical value of design seismic brace loads.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed steel studs and tracks or equivalent gauge steel studs and tracks, firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association and Steel Stud Manufacturers Association (SSMA).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft..

2.2 FRAMING SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CEMCO; California Expanded Metals Products, Inc.
 - 2. ClarkDietrich Building Systems, LLC
 - 3. Marino\WARE.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- C. Studs and Tracks: ASTM C 645. Use one of the following:
 - 1. Steel Studs and Tracks:
 - a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
 - b. Depth: As indicated on Drawings.
 - 2. Embossed, High Strength Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
 - a. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
 - b. Depth: As indicated on Drawings.
 - 3. Exception: Members that can show certified third party testing with gypsum board in accordance with ICC-ES AC86 need not meet the minimum thickness limitation or minimum section properties set forth in ASTM C 645. The submission of an evaluation report is acceptable to show conformance to this requirement. Use ASTM C 645 steel, in thickness of minimum 0.019 inch.
- D. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.; SLP-TRK Slotted Deflection Track.
 - 2) ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track.
 - 3) MarinoWARE.
 - 4) MBA Building Supplies; Slotted Deflecto Track.
 - 5) Metal-Lite; The System.
- E. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CEMCO; California Expanded Metal Products Co.; FAS Track.
 - b. ClarkDietrich Building Systems; BlazeFrame.
 - c. Fire Trak Corp; Fire Trak System attached to studs with Fire Trak Posi Klip.
 - d. MarinoWARE; FAS Track 1000.
 - e. Metal-Lite; The System.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.018 inch.
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
1. Depth: 1-1/2 inches.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.0179 inch.
 2. Depth: 7/8 inch unless otherwise indicated on Drawings.
- I. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical or hat shaped.
- J. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: 3/4 inch.
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- K. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, load equal to 5 times imposed by construction as determined by testing per ASTM E488 by independent testing agency.
 - a. Uses: Securing hangers to structure.
 - b. Type: Postinstalled, chemical anchor or postinstalled, expansion anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 2. Power-Actuated Anchors: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, load equal to 10 times that imposed by construction as determined by testing per ASTM E1190 by independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 2. Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0179 inch.
 - b. Depth: As indicated on Drawings.
 3. Embossed Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0190 inch.

- b. Depth: As indicated on Drawings.
- 4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Metal Thickness: 0.0179 inch.
- 5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset

anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

- c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- E. Z-Shaped Furring Members:
 1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced **[24 inches]** <Insert dimension> o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Hangers: 48 inches o.c.
 2. Carrying Channels (Main Runners): 48 inches o.c.
 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within **[performance limits established by referenced installation standards]** <Insert deflection limit>.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

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:

- 1. Interior gypsum board.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install interior gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed; a Saint-Gobain company.
 - 2. Georgia-Pacific Gypsum.
 - 3. National Gypsum Company.
 - 4. USG Corporation.
- B. Gypsum Wallboard, Type X: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch unless otherwise indicated.
 - 2. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: Vertical surfaces unless otherwise indicated.
 - 2. Type X: Where required for fire-resistance-rated assembly.
 - 3. Ceiling Type: Ceiling surfaces.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where indicated.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

- B. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- C. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 09 30 00 - TILING

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:
 - 1. Ceramic mosaic tile.
 - 2. Tile backing panels.
 - 3. Metal edge strips.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 and ANSI A137.3 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17 and ANSI A108.19, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.

3. Full-size units of each type of trim and accessory for each color and finish required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of product.
- C. Product Test Reports: For tile-setting and -grouting products.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
 1. Installer is a five-star member of the National Tile Contractors Association.
 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
 3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
 - a. Installer holds Advanced Certification for Tile Installers (ACT) in the following areas: Large Format Tile & Substrate Preparation, Membranes, Mortar Floors, and Mortar Walls.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution, including grouted joints, composition, pattern and custom blending of tile for each type, color, and finish required. Mockups shall be minimum 36 inches square or in sizes as directed by Architect.
 1. Build mockup of each type of wall tile installation.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 or ANSI A137.3 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 WARRANTY

- A. Manufacturer's System Warranty: Manufacturer agrees to repair or replace tile installation that fail(s) in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year(s) from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type CWT1: Factory-mounted glazed ceramic mosaic tile.
1. Basis-of-Design: Subject to compliance with requirements, provide Basis-of-Design product or a comparable product by the following:
 - a. Basis-of-Design: Daltile; Revalia Picket.
 - b. Crossville, Inc.
 - c. Emser Tile and Natural Stone.
 - d. Florida Tile.
 2. Composition: Ceramic.
 3. Module Size: 1 by 4 inches.
 4. Thickness: 3/8 inch.
 5. Finish: Glazed.
 6. Tile Color and Pattern: As indicated on Finish Schedule on Drawings.
 7. Grout Color: White.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. Custom Building Products.
 - c. Georgia-Pacific Gypsum LLC.
 - d. USG Corporation.
 2. Thickness: 5/8 inch.

2.5 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ARDEX Americas; X77.
 - b. Custom Building Products; Porcelain Tile.
 - c. Laticrete International, Inc.; 254 Platinum.
 - d. TEC: H.B. Fuller Construction Products Inc.; Full Flex.
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.

4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.6 GROUT MATERIALS

- A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products; CEG Lite.
 - b. Laticrete International, Inc.; Spectralock Pro Premium.
 - c. MAPEI Corporation; Kerapoxy.
 - d. TEC: H.B. Fuller Construction Products Inc.; Accucolor EFX.
 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.7 MISCELLANEOUS MATERIALS

- A. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone.
 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE BACKING PANEL INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.4 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges. .D

- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

- F. Joint Widths: Unless otherwise indicated, install tile with the joint widths the narrowest joint recommended in writing by tile manufacturer.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Relocated Movement Joints: Where tile joints do not align with substrate joints or existing in-plane substrate cracks, offset soft joints over crack isolation membrane in accordance with TCNA Method F125-Partial-15.
 - 1. Minimum width of crack suppression membrane: Three times the width of tile adjacent to substrate crack or joint, such that tile on either side of joint is fully supported on membrane.
- C. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations, Wood or Metal Studs or Furring:
 - 1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
 - a. Ceramic Tile Type: Ceramic mosaic tile.
 - b. Thinset Mortar: Modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.

END OF SECTION 09 30 00

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

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SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for interior ceilings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.
 - 3. Clips: Full-size hold-down clips.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 5. Size and location of initial access modules for acoustical panels.
 - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.

g. Perimeter moldings.

- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.
- E. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and

ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Class A according to ASTM E1264.
 2. Smoke-Developed Index: 50 or less.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS APC1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the Basis-of-Design indicated or a comparable product by one of the following:
 1. Basis-of-Design: USG Corporation; Mars No. 86185.
 2. Armstrong World Industries.
 3. CertainTeed Ceilings.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 1 and 2, with washable vinyl-film overlay.
 2. Pattern: E, G as indicated by manufacturer's designation.
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.90.

- F. Ceiling Attenuation Class (CAC): Not less than 35.
- G. Noise Reduction Coefficient (NRC): Not less than 0.75.
- H. Edge/Joint Detail: Square.
- I. Thickness: 3/4 inch.
- J. Modular Size: 24 by 24 inches.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 ACOUSTICAL PANELS APC2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the Basis-of-Design indicated or a comparable product by one of the following:
 - 1. Basis-of-Design: Turf Design; Slice Ceiling System.
 - 2. BuzziSpace.
 - 3. Unika Vaev.
- B. Product Description: 9 mm thick, recycled PET felt board units that unfold and snap into place within standard tee grid suspension systems.
- C. Tile Color: Green.
- D. Modular Size: 24 by 24 inches.

2.5 METAL SUSPENSION SYSTEM

- A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide the Basis-of-Design indicated or a comparable product by one of the following:
 - 1. Basis-of-Design: USG Corporation; DONN Brand.
 - 2. Armstrong World Industries.
 - 3. CertainTeed Ceilings.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.

5. Cap Finish Color:
 - a. Colors for APC1 and APC2: White.
 - b. Color for APC3: Black.

2.6 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled expansion or postinstalled bonded anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 2. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
 3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Hold-Down Clips: Manufacturer's standard hold-down.

2.7 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
 - 1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 4. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

- a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
5. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
6. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

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:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.
- C. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Final Acceptance, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE (RB1)

- A. Basis-of-Design: Subject to compliance with requirements, provide Basis-of-Design products as indicated on the finish schedule or comparable by one of the following:
 - 1. Flexco.
 - 2. Roppe Corporation USA.
 - 3. Tarkett USA.
- B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location: As indicated on Drawings.
- 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: Match existing.

2.2 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Flexco.
- b. Roppe Corporation USA.
- c. Tarkett USA.

- B. Description: Transition strips.
- C. Material: Rubber.
- D. Profile and Dimensions: As indicated on Drawings.
- E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
- C. Metal Edge Strips: Extruded aluminum with mill finish, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. Job-Formed Corners:
 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

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:
 - 1. Solid vinyl floor tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE LVT1

- A. Basis-of-Design: Subject to compliance with requirements, provide the Basis-of-Design indicated or a comparable product by one of the following:
1. Basis-of-Design: Milliken & Company.
 2. Karndean Design Flooring.
 3. Mohawk Industries.
- B. Tile Standard: ASTM F1700.
1. Class: As indicated by product designations.
 2. Type: A, Smooth Surface.
- C. Thickness: 0.197 inch.
- D. Wear Layer Thickness: Minimum 20 mils.
- E. Size: 9 by 60 inches.
- F. Seamless-Installation Method: Loose lay with perimeter adhesive.
- G. Colors and Patterns: As indicated on Finish Schedule on Drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

- B. Concrete Substrates: Prepare according to ASTM F710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

- a. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 95 percent relative humidity level measurement.

- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

- E. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.

- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

- C. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- D. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- F. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Final Acceptance.

END OF SECTION 09 65 19

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

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SECTION 09 68 13 - TILE CARPETING

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:

- 1. Modular carpet tile.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

- B. Shop Drawings: For carpet tile installation, plans showing the following:

- 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
- 2. Carpet tile type, color, and dye lot.
- 3. Type of subfloor.
- 4. Type of installation.
- 5. Pattern of installation.
- 6. Pattern type, location, and direction.
- 7. Pile direction.
- 8. Type, color, and location of insets and borders.
- 9. Type, color, and location of edge, transition, and other accessory strips.
- 10. Transition details to other flooring materials.

- C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
 - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups at locations and in sizes shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: Lifetime from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 CARPET TILE CPT1, CPT2, CPT3

- A. Basis-of-Design: Subject to compliance with requirements, provide products by the Basis-of-Design indicated or a comparable product by one of the following:
 - 1. Basis-of-Design: Milliken & Company.
 - 2. Mohawk Flooring.
 - 3. Shaw Contract.
- B. Color: As indicated on Finish Schedule on Drawings.
- C. Pattern: Match Architect's samples.
- D. Fiber Content: 100 percent nylon 6, 6.

- E. Pile Characteristic: Tufted, textured loop pile.
- F. Surface Pile Weight: 15 oz./sq. yd..
- G. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- H. Size: 25 cm by 25 cm.
- I. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable Retain "Metal Edge/Transition Strips" Paragraph below unless resilient edge strips for carpet tile are specified in Section 096513 "Resilient Base and Accessories." If retaining, revise to suit Project and indicate width requirements on Drawings.
- C. Metal Edge/Transition Strips: Extruded aluminum with [mill] <Insert finish> finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

- a. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 09 72 00 - WALL COVERINGS

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:
 - 1. Vinyl digital wall covering.
 - 2. Vinyl film.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate veneer matching, seams and termination points.
- C. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- long in size.
 - 1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
 - 2. Wood-Veneer Wall-Covering Sample: From same flitch to be used for the Work, with specified finish applied.
- D. Product Schedule: For wall coverings and film. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wall covering and film, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings and film to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall-Covering and Film Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
 - 1. Build mockups for each type of wall covering on each substrate required, in sizes directed by Architect. Comply with requirements in ASTM F 1141 for appearance shading characteristics.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Final Acceptance.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 286.

2.2 VINYL WALL COVERING (VWC1 and VWC2)

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products by the Basis-of-Design indicated or a comparable product by one of the following:
 1. Basis-of-Design: National Wallcovering; Level.
 2. Eykon Wallcovering.
 3. Maharam.
 4. Wolf Gordon.
- B. Pattern and Colors: As indicated on Finish Schedule on Drawings.

2.3 VINYL FILM WALL COVERING (VF1)

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products by the Basis-of-Design indicated or a comparable product by one of the following:
 1. Basis-of-Design: 3M; DI•NOC Architectural Finishes.
 2. RVinyl Architectural Films.
 3. VVivid Vinyls, Inc.
- B. Pattern and Colors: As indicated on Finish Schedule on Drawings.
- C. Description: Pressure-sensitive graphic film with architectural finishes applied with proprietary air release channels.

2.4 VINYL FILM WALL COVERING (VF2)

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products by the Basis-of-Design indicated or a comparable product by one of the following:
 1. Basis-of-Design: National Wallcovering; Level.
 2. 3M.
 3. Llummar Films.
- B. Pattern and Colors: As indicated on Finish Schedule on Drawings.
- C. Description: Pressure-sensitive graphic film with architectural finishes applied with proprietary air release channels.

2.5 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Install seams vertical and plumb at least 6 inches from outside corners and 3 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- F. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 VINYL FILM WALLCOVERING INSTALLATION

- A. Comply with vinyl film wall covering manufacturer's written installation instructions applicable to products and applications indicated.

3.5 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

LITTLE™
DIVERSIFIED ARCHITECTURAL CONSULTING

SECTION 09 91 23 - INTERIOR PAINTING

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 surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel and iron.
 - 2. Gypsum board.
 - 3. Glass-fiber-reinforced gypsum fabrications (column cover).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, unless otherwise indicated in Part 3:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints.
 - 3. Sherwin-Williams Company (The).
- B. Products, General: Refer to end of Part 3 of this Section for specific products and listing of applications for each product.
- C. Colors: As indicated on Finishes Schedule on Drawings.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 50 g/L.
 - 3. Dry-Fog Coatings: 150 g/L.
 - 4. Primers, Sealers, and Undercoaters: 100 g/L.
 - 5. Rust-Preventive Coatings: 100 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Shellacs, Clear: 730 g/L.
 - 9. Shellacs, Pigmented: 550 g/L.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Apply primers and finish coats in accordance with manufacturer's recommended wet-film thickness, square foot per gallon, and mil thickness per coat. Do not add solvent or thinner to paint and coating products.
- F. Allow adequate drying time before handling and before applying subsequent coats. Low VOC and water-based paint systems require longer drying times. Comply with manufacturer's written instructions. Protect in accordance with "Cleaning and Protection" Article below.
- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.

- d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIRE-RATED ASSEMBLIES

- A. By stenciling, permanently identify corridor partitions, smokestop partitions, horizontal exit partitions, exit enclosures and fire walls. Above decorative ceiling line and in concealed spaces, on both sides of wall, apply a minimum one-inch wide red line interrupted at maximum 12-ft. spacing with the wording "X HOUR FIRE AND SMOKE BARRIER – PROTECT ALL OPENINGS" in 4-inch high letters with "X" designating the appropriate hourly rating.

3.5 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINTING SCHEDULE

A. Metal Substrates (Steel and Iron):

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, rust inhibitive, water based.

1) Products: Subject to compliance with requirements, provide one of the following:

- a) Benjamin Moore; Ultra Spec HP Acrylic Metal Primer, HP04. Applied at a wet film thickness of minimum 4.0 mils or 1.7 mils dry.
- b) PPG Paints; Seal Grip Interior/Exterior Acrylic Universal Primer, 17-921XI Series. Applied at a wet film thickness of minimum 4.0 mils or 1.6 mils dry.
- c) Sherwin-Williams; Pro Industrial Pro-Cryl Universal Primer, B66-310 Series. Applied at a wet film thickness of minimum 5.0 mils or 1.8 mils dry.

b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5).

1) Products: Subject to compliance with requirements, provide one of the following:

- a) Benjamin Moore; Eco Spec WB Interior Latex Semi Gloss Finish, N376. Applied at a wet film thickness of minimum 3.8 mils or 1.5 mils dry.
- b) PPG Paints; Speedhide Zero Interior Zero-VOC Latex Semi Gloss, 6-4510XI. Applied at a wet film thickness of minimum 4.0 mils or 1.3 mils dry.
- c) Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series. Applied at a wet film thickness of minimum 4.0 mils or 1.5 mils dry.

B. Gypsum Board and GFRG Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.

1) Products: Subject to compliance with requirements, provide one of the following:

- a) Benjamin Moore; Eco Spec WB Interior Latex Primer, N372. Applied at wet film thickness of 4.0 mils or 1.2 mils dry.

- b) PPG Paints; Speedhide Interior Latex Sealer Quick Drying, 6-2. Applied at a wet film thickness of minimum 4.0 mils or 1.0 mils dry.
 - c) Sherwin-Williams; ProMar 200 Latex Primer, B28W02600. Applied at a wet film thickness of minimum 4 mils or 1.0 mils dry.
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, institutional low odor/VOC, flat (Gloss Level 1).
- 1) Products: Subject to compliance with requirements, provide one of the following:
 - a) Benjamin Moore; Eco Spec WB Interior Latex Flat Finish, N373. Applied at a wet film thickness of minimum 3.8 mils or 1.5 mils dry.
 - b) PPG Paints; Speedhide Zero Interior Zero-VOC Flat, 6-4110XI. Applied at a wet film thickness of minimum 4.0 mils or 1.4 mils dry.
 - c) Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series. Applied at a wet film thickness of minimum 4.0 mils or 1.6 mils dry.
- d. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (Gloss Level 3).
- 1) Products: Subject to compliance with requirements, provide one of the following:
 - a) Benjamin Moore; Eco Spec WB Interior Latex Eggshell Finish, N374. Applied at a wet film thickness of minimum 3.8 mils or 1.4 mils dry.
 - b) PPG Paints; Speedhide Zero Interior Zero-VOC Eggshell, 6-4310XI. Applied at a wet film thickness of minimum 4.0 mils or 1.5 mils dry.
 - c) Sherwin-Williams; ProMar 200 Zero VOC Interior Eg-Shel Latex, B20-2600 Series. Applied at a wet film thickness of minimum 4.0 mils or 1.7 mils dry.
- e. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5).
- 1) Products: Subject to compliance with requirements, provide one of the following:
 - a) Benjamin Moore; Eco Spec WB Interior Latex Semi Gloss Finish, N376. Applied at a wet film thickness of minimum 3.8 mils or 1.5 mils dry.
 - b) PPG Paints; Speedhide Zero Interior Zero-VOC Latex Semi Gloss, 6-4510XI. Applied at a wet film thickness of minimum 4.0 mils or 1.3 mils dry.
 - c) Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series. Applied at a wet film thickness of minimum 4.0 mils or 1.5 mils dry.

END OF SECTION 09 91 23

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A



SECTION 21 01 00 – GENERAL PROVISIONS – FIRE PROTECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work to be done under Division 21 contracts shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all work as shown on the plans and herein specified, excepting only work materials specified or noted as being furnished or installed by others.
- B. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotation.
- C. The Fire Protection contractor for this single prime contract may hereinafter also be referred to as "This Contractor, "FP", or Division 21 Contractor.
- D. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule or architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.
- E. Division of the Specification into sections is for the purpose of simplification alone. Responsibility for the work of various trades shall rest with the Contractor. Various sections of this Division are related to each other as well as the mechanical drawings. Examine all drawings and read all applicable parts of the project manual in order to insure complete execution of all work in this Division, coordinating where required with other trades in order to avoid conflicts.
- F. These specifications and accompanying drawings are intended to cover the furnishing of all labor, materials, equipment and services necessary for the complete installation and acceptable performance of the mechanical systems. Small items of material, equipment and appurtenances not mentioned in detail or shown on the drawings, but necessary for complete and operating systems, shall be provided by this contractor without additional charge to the Owner and shall be included under this contract.
- G. In general, specifications establish the quality of material, equipment and workmanship. The contract documents are intended to secure for the Owner, a first class installation in every respect. Labor shall be ready for satisfactory and efficient operation.
- H. The contractor shall carefully examine the drawings and specifications before accepting the contract. He shall call attention to any changes or additions which, in his opinion, are necessary to make possible the fulfillment of any guarantee called for by these specifications; failing which, it shall be deemed that he has accepted full responsibility for all such guarantees.
- I. The contractor shall put his work in place as fast as is reasonably possible. He shall, at all times, keep a competent foreman in charge of the work, to make decisions necessary for the diligent advancement of the work. The Contractor shall facilitate the inspection of the work by the Owner's Representative.
- J. The Contractor shall coordinate all Fire Protection related work in the building in order to facilitate intelligent execution of the work. He shall also remove any rubbish as expeditiously as possible.

- K. Materials or products specified herein and/or indicated on the drawings by trade names, manufacturer's names or catalog numbers establish the quality of materials or products to be furnished.
- L. Points of connection or continuation of work under this contract are so marked on drawings or herein specified. In case of any doubt as to the required exact location of such points, the Owner's Representative shall decide and direct.

1.2 SPECIALTY SCOPE OF WORK INCLUDED:

- A. The fire protection contractor shall include in the base bid and alternate bids all costs and time for himself, and any required subcontractors to accomplish the scope of work. Work under the fire protection contract shall include, but shall not be limited to, the furnishing, unloading, handling, distribution, setting and installation of all components required for the following systems:
 - 1. All interior wet standpipe and sprinkler systems, as indicated for the Phase 1 Scope of Work.
 - 2. Sprinkler head locations as required per code, as indicated for the Phase 1 Scope of Work.
 - 3. Fire pump and related accessories
 - 4. Shop Drawings

1.3 RELATED WORK WHICH IS A PART OF SECTION 21 01 00

- A. All work done under this section of the specification is subject to the Architect's instructions to bidders, general conditions and their corresponding supplements.
- B. Refer to the supplementary general conditions of these specifications for temporary services and facilities that shall be provided.

1.4 DEFINITIONS:

- A. "Piping": Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents, and items customarily required in connection with the transfer of fluids.
- B. "Ductwork": All air delivery, recirculation and exhaust ducts, whether of sheet metal or other material, and includes all connections, accessories, and appurtenances necessary for and incidental to a complete system.
- C. "Provide" (P): Furnish and install complete ready for use.
- D. "Furnish" (F): Purchase and deliver to the project site complete with every necessary appurtenance and support.
- E. "Install"(I): Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation of the proper location in the project.
- F. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double piping off of all utilities shall be provided by the General Contractor.

- G. "By Other Trades": Shall mean by persons or parties who are not anticipated to be the Contractor of this trade working together with the general contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall contract.

1.5 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to an individual element of work, take precedence over the specifications where they conflict with same.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.
- D. The drawings of necessity utilize symbols as schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specification only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.6 DELINEATION OF WORK:

- A. The Division 21 contractors is required to supply all necessary supervision and coordination of information to any others who are performing work to accommodate the fire protection installation.
- B. The specifications for the overall construction delineate various items of work under separate section headings. The list below set forth this delineation to the extent that it affects the fire protection work category. In the absence of more detailed information, this list shall be taken as a specific instruction to the fire protection contractor to include the work assigned to him. Indications that each contractor is to perform the work mean that it is to perform the work for its own accommodation only, except as specifically noted otherwise.

"P" indicates Provide, "F" indicates Furnish, "I" indicates Install					
Item	"General"	"Plbg"	"Mech"	"FP"	Remarks
Fire protection				P	Refer to Section 21 01 04 & Electrical Dwg.
Wiring for fire protection equipment					Refer to Section 21 01 04 & Electrical Dwg.
Hoisting				P	
Rigging				P	
Cutting and Patching				P	
EXCEPTION: Cost where due to late installation or improper coordination of work is the responsibility of the delinquent contractor. Locations shall be approved by structural engineer.					
For new construction, framed slots and openings in walls, decks and slabs	P				
EXCEPTION: Coordination drawings are required from fire protection contractor.					
Sleeves through non-membraned slabs, decks and walls				P	
EXCEPTION: Refer to Division 3 for coordination of installation.					
Sleeves through membraned slabs, decks and walls				P	
EXCEPTION: Refer to Division 3 for coordination of installation.					
Fireproof sealing of excess opening in slabs, decks and fire rate walls				P	
Fastenings				P	
Supports				P	
Concrete foundations, pads & bases inside buildings				P	
Field touch-up painting damaged shop coats				P	
Finish painting of exposed work				P	

"P" indicates Provide, "F" indicates Furnish, "I" indicates Install					
Item	"General"	"Plbg"	"Mech"	"FP"	Remarks
<u>EXCEPTION:</u> Painting of equipment, piping, etc. in mechanical spaces provided by fire protection contractor.					
Finished wall and ceiling access doors, panels and support frames				P	
Removal of spray on proofing from fire protection equipment	P				
Rubbish removal				P	
<u>EXCEPTION:</u> Where one trade furnishes and another installs, the installing trade removes the shipping and packing material which accumulate.					
Special tools for equipment maintenance				P	
Fire protection piping and associated work at 12" aff and interior to the building				P	

1.7 STANDARDS AND CODES:

- A. Nothing in this specification shall be interpreted to conflict with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction."
- C. All equipment with electrical components shall bear the UL label.
- D. The following minimum standards apply wherever applicable:
 - 1. ANS American National Standards
 - 2. ASME American Society of Mechanical Engineers
 - 3. ASTM American Society for Testing Materials
 - 4. NEMA National Electrical Manufacturers Association
 - 5. NFPA National Fire Protection Association
 - 6. OSHA Occupational Safety and Health Act

1.8 INSPECTION AND COOPERATION:

- A. All work shall be done under the periodic observation of and to the complete satisfaction of the Architect. No deviations from the Drawings and Specifications will be allowed without prior written approval of the Architect. The fire protection contractor shall each cooperate with the other contractors to allow for the installation of their work as well as his own.

- B. The fire protection contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this contractor without regard for other work, or if a conflict results, must be changed if directed by the Architect or Engineer without additional cost to Owner or his agents.
- C. Relocation of equipment, system connections or rough-in locations up to ten feet (10'), if necessary, shall be done at no additional cost to the Owner or his agents if done before roughing-in.
- D. All concealed work shall be inspected by the Architect or his appointed representative before being concealed. Fire protection contractor shall each call for inspection at least two (2) work days before concealment.
- E. The Architect shall have the right to inspect the work whenever advisable in his judgment. The fire protection contractor shall have a representative present at each inspection and shall give such assistance as may be required.
- F. Recommendations made by the Architect shall be promptly carried out and all unsatisfactory material and workmanship replaced at once to the Architect's satisfaction at the fire protection contractor expense.
- G. The fire protection contractor shall be responsible for hoisting of all materials and equipment furnished under as part of his portion of the work in accordance with all City, State, and Federal rules and regulations.
- H. Engineer's Response to RFIs:
 - 1. Due to the technical and aesthetic nature of this project, the fire protection contractor shall be pro-active in his understanding of work efforts to allow the engineer a minimum of 10 working days to respond to RFIs without consideration of time delay to the project schedule.

1.9 TEMPORARY SERVICES AND FACILITIES:

- A. Refer to general requirements for temporary services and facilities that shall be provided.

1.10 UNIT PRICES:

- A. Refer to general requirements relative to "Add" or "Deduct" prices relative to this contract.

1.11 ROCK EXCAVATION UNIT PRICES

- A. Refer to Section 01 22 00, as applicable.

1.12 SUBMITTALS:

- A. LIST OF MANUFACTURERS: Within twenty days following award of contract, the fire protection subcontractor shall start submitting the required information pertaining to the equipment and materials he shall be furnishing, commencing with the list of manufacturers for approval by the Engineer. Following up in short order shall be the shop drawings, coordination documents and other documents. The Owner and his representatives reserve the right to reject as

unacceptable any items for which, in their judgment, they have not been allowed adequate lead time in which to investigate suitability, or their experience has proved the service or equipment unsatisfactory.

Item	Manufacturers		
Seismic Restraints	Mason	Unistrut	Grinnell
Piping	Allied	Grinnell	Ladish
Tamper Switches	System Sensor	Simplex	Potter Roemer
Water Flow Switch	System Sensor	Simplex	Potter Roemer
Supervisory Switch	Potter-Roemer	Simplex	System Sensor
Globe Valve	United	Hammond	Jenkins
Pressure Gauge	Grinnell	Palmer	Wekler
Hangers	Grinnell	Tolco	PHD
Identification	Seton	Calpico	SSC

1.13 SHOP DRAWINGS:

- A. Equipment shop drawings shall include service space requirements, manufacturer's equipment installation brochure and all noise and vibration information.
- B. Prior to purchasing any equipment or materials, the approved list of the manufacturers shall be returned by the Engineer to the Contractor.
- C. Contractor-reviewed and stamped "Approved" shop drawings shall be submitted conforming to the requirements stated in supplementary conditions and Division I for the items indicated throughout the following specifications:
- D. Documents will not be accepted for approval unless:
 - 1. They comply with the requirements of the supplement to the General Conditions.
 - 2. They include complete information pertaining to appurtenances and accessories.
 - 3. They are submitted as a package where they pertain to related items.
 - 4. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 - 5. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
- E. Approval of shop drawings does not invalidate the plans and specifications if in conflict unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

1.14 FABRICATION / COORDINATION DRAWINGS:

- A. Due to the complexity of the review, the fabrication/coordination drawings and controls and instrumentation shop drawings shall be submitted in not less than four (4) packages early enough to allow a 30-day review period followed by a second 30 day review period of shop drawings review and comments. Spacing of submittals shall be at no less than 15 working days.
- B. Fabrication drawings are not shop drawings but are reviewed by the engineer but are not approved as typical for a shop drawing. Until submitted to engineer and to a point in time when all engineer review comments are reconciled on these drawings by the contractor, 15% of the

Fire Protection Contract will be retained from fire protection portion of the application for payment.

- C. The contractor shall submit to the A/E all coordination drawings and fabrication drawings. Hard copy documents will be reviewed by the A/E and returned with written comments.
- D. Following up within 5 working days after the return of these documents at the office of the construction manager, all parties will meet to resolve conflicts.

1.15 RECORD DRAWINGS

- A. Purchase and maintain at the job site a complete and separate set of prints of the approved working Drawings on which to accurately indicate daily progress by coloring materials and apparatus as installed. Schedules shall be modified to reflect data consistent with that of the installed equipment. Clearly show all changes to the work as a result of change orders, instructions issued by the Architect or conditions encountered in the field. Accurately indicate the location, size, type and elevation of new utilities and their relationship to existing utilities.
- B. The marked-up and colored-in prints will be used as a guide for determining the progress of the work installed. They shall be inspected at the architect's discretion and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment may not be approved until the drawings are accurate and up-to-date.
- C. The fire protection contractor shall provide one set of marked plans to the Engineer for his review and approval of record drawings. The approved plans shall be returned to the Contractor for his CADD preparation of documents using AutoCad 2010 to indicate correct location of all equipment, piping, etc. as installed on project.
- D. The drawings shall provide an accurate and complete record of the work as installed.

PART 2 - PRODUCTS:

2.1 MATERIALS AND MANUFACTURERS:

- A. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. All equipment shall bear labels attesting to Underwriter Laboratories approval where subject to Underwriters Laboratory label service. Where no specific indication as to the type of material or equipment is indicated a first class standard article shall be furnished.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. It is the intent of the specifications that wherever manufacturers of a product are specified any substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction such as lesser heat exchange surface, etc.).
- C. Substituted equipment where permitted or approved, must conform to space requirements, whether approved or not or shall be replaced at the contractor's expense. Any modification of related systems as a result of substitutions shall be made at the contractor's expense.

- D. Note the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Engineer, Architect, or any other Owner's Representative, attests to the dimensional accuracy or the ability of the material or equipment involved or the mechanical performance of the equipment. Approval of shop drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

2.2 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. It is the purpose of this specification not to exclude competition between manufacturers of similar equipment.
- B. Where items are specified as "or approved equivalent" prior approval must be obtained from the Engineer. Said approval does not intend to obligate the Engineer in the event shop drawings submitted do not indicate equality of materials, workmanship or function and the right to reject substitutes shall remain the prerogative of the Engineer.
- C. In all cases regardless of method of submission, the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed. Minor modifications to suit standard manufactured items are acceptable if approved by Engineer.
- D. Should contract documents fail to describe particular materials or goods to be used, then it shall be the duty of contractor to inquire of Engineer as to what is to be used and to supply it at contractor's expense or else thereafter or to require corrections.
- E. The fire protection contractor shall promptly remove, at own expense, rejected materials from site of work.
- F. When material has been approved, no change in brand or make will be permitted without approval of Engineer.
- G. The fire protection contractor shall include the requirements of the State of North Carolina - Instructions to Bidders and General Conditions (Form OC-15) Article 8 within his bid.

2.3 NAMEPLATES:

- A. All items of operation equipment used on the project shall be provided with a nameplate mounted in a conspicuous place on the unit. Plate shall be embossed metal or stamped metal securely fastened to the unit.
- B. The plate shall contain the following information:
 - 1. Manufacturer's name and address
 - 2. All approval stamps, AGA, UL, Etc. as hereinafter specified.
 - 3. Complete capacity and operating data as approved by Engineer
 - 4. Motor Characteristics
 - 5. Serial number and code numbers
 - 6. Date of manufacture

PART 3 - EXECUTION:

3.1 WORKMANSHIP:

- A. Workmanship shall be of best quality. Good appearance of finished work shall be of equal importance with its mechanical efficiency. No make-shifts shall be permitted anywhere in work and all portions work shall be so laid out and installed that work as a whole is of uniform quality and appearance.

3.2 PROTECTION OF EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.
- D. The Division 21 contractor shall be responsible for the work damaged by him in executing this contract.

3.3 CONTIGUOUS WORK:

- A. If any part of the Fire Protection contractors work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, the contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the Division 21 contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

3.4 CERTIFICATES OF INSPECTION AND APPROVAL:

- A. Upon completion of work, the fire protection contractor shall furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.5 SLEEVES AND OPENINGS:

- A. All sleeves and openings required shall be located and provided for by the Division 21 contractor for his portion of the work. Core drilling for missed sleeves shall be provided by this contractor.
- B. In order to minimize liquid leakage or transfer of air between floors, it is the intent that pipe penetrations of floors be held to a minimum. Where it is necessary to penetrate floors, the pipe shall pass through sleeves set in the concrete, and the space between the pipe and sleeve shall be caulked to make it air tight.

3.6 ACCESS TO EQUIPMENT AND VALVES:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.
- C. Where devices are to be concealed in walls or above nonremovable ceilings, this contractor shall provide the required access panels to the GC for installation for their respective equipment.
- D. Size of panels shall be larger than the devices for accessibility and shall be 12" x 12" square for all wall panels and 24" x 24" for ceiling panels.

3.7 COORDINATION:

- A. The fire protection contractor is cautioned that portions of the building has an unusually high quantity of piping, ducts, conduits, and other mechanical equipment, and space is limited. Offset pipes as required to avoid interference at no additional cost to the Owner. Generally pipes in which grade must be maintained, such as waste and storm drain piping, and sprinkler piping, shall have first priority. Other pipes shall be offset as required to avoid those items. The mechanical contractor will be required to prepare coordinated shop drawings of the ductwork. The fire protection contractor will be furnished copies of these drawings and shall use them in determining pipe routing. Generally, service piping (water, gas, air, etc.) shall be run below ductwork to allow access to the piping. Where pipes of two trades conflict, (e.g. domestic water pipe vs. chilled water pipe), generally the smaller pipe shall be offset.
- B. The Mechanical contractor will make the basic duct drawings and send sepias to the fire protection contractor. Within 30 days after receiving the sepias, the fire protection contractor shall return them to the mechanical contractor, marked to show how fire protection pipes cross the ducts, and with suggested pipe elevation for each pipe. The mechanical contractor will use this information plus similar information received from other contractors to prepare the finished coordination drawings.

3.8 CHASES, CUTTING AND PATCHING:

- A. In new construction, chases in walls for any work to be installed by this contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the general contractor's work.
- B. If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, he shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.
- C. The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure or any part thereof. This contractor shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting from cutting shall be under the supervision of the Superintendent of the General Contractor.

END OF SECTION 21 01 00

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SECTION 21 01 04 – DIVISION OF WORK (21/26)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section delineates the DIVISION OF WORK between Division 21 and Division 26.
- B. Specific work to be done under Division 26 is herein after listed or described. All other work necessary for the operation of Division 21 equipment shall be performed under Division 21.

1.2 DIVISION OF WORK:

- A. Under Division 26, power wiring rough-in shall be provided with junction box, trough, starter or disconnect switch, as required by the specific piece of equipment. Equipment final connections shall be provided under Division 26.
- B. All electric bells, flow switches and tamper switches required by Division 21 equipment, and other appurtenances associated with equipment under Division 21 shall be furnished and installed under Division 21.
- C. All wiring required for controls and instrumentation not indicated on the drawings shall be furnished and installed by Division 21.
- D. Additional power wiring required for fire protection equipment over and above what is shown on electrical drawings shall be provided under Division 21 work.
- E. Power wiring and final connection to the equipment shall be provided under Division 26 work.

END OF SECTION 21 01 04

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SECTION 21 02 08 – FIRE PROTECTION IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 SCOPE:

- A. All exposed pipe, hangers, and equipment installed by this fire protection contractor shall be painted unless they have a factory finish or are noted otherwise. Exposed chromeplated brass, stainless steel, or galvanized piping will not be painted.
- B. Type of identification devices specified in this section include the following:
 - 1. Plastic Pipe Markers
 - 2. Plastic Tape
 - 3. Valve Tags
 - 4. Valve Schedule Frames
 - 5. Engraved Plastic-Laminate Signs

1.2 QUALITY ASSURANCE:

- A. Manufacturers: Firms regularly engaged in manufacturer of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.3 SUBMITTALS:

- A. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags," in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 1.

PART 2 - PRODUCTS:

2.1 PLASTIC PIPE MARKERS:

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color-coded, plastic-sheet pipe markers, complying with ANSI A13.1.

- B. Small Pipes: For external diameters less than 6", provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
 - 1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 - 2. Adhesive lap joint in pipe marker overlap.
 - 3. Laminated or bonded application of pipe marker to pipe.
- C. Large Pipes: For external diameters of 6" and larger, provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
 - 1. Laminated or bonded application of pipe marker to pipe.
 - 2. Strapped-to-pipe application of semi-rigid type, with manufacturer's standard stainless steel bands.
- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
- E. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 PLASTIC TAPE:

- A. Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.
- B. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.3 VALVE TAGS: (PROVIDE ONE OF THE FOLLOWING):

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1-1/2" diameter tags, except as otherwise indicated.
- B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.4 VALVE SCHEDULE FRAMES:

- A. For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on walls. Provide frames of rigid plastic or metal, with plastic glazing.

2.5 ENGRAVED PLASTIC-LAMINATE SIGNS:

- A. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 LETTERING AND GRAPHICS:

- A. Coordinate names, abbreviations and other designations used in fire protection identification work with corresponding designations shown pre-existing, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer's or as required for proper identification and operation/maintenance of fire protection systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: Alarm Check Valve, etc.).

2.7 PAINT:

- A. All products shall be in accordance with the specifications for painting in the general contract.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. Any equipment shipped with a factory applied finish shall be touched up to repair any damage to the finish so that it is the same as new.
- B. In the mechanical equipment rooms the fire protection contractor shall be responsible for painting all piping, equipment, and accessories installed under their respective contract.
- C. In other parts of the buildings items which are in place in finished areas when general building painting is done will be painted by the General Contractor. Items installed after painting is completed shall be painted by the fire protection contractor, as directed by the architect.
- D. All exposed nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the fire protection system shall be painted with two coats of enamel.
- E. All exposed piping including insulated piping, insulated by this sub-contractor shall be painted two coats of lead and oil paint.
- F. Do not field paint exposed copper pipe, brass valves, or brass trim on iron body valves, or machinery or equipment that has a factory applied finish unless otherwise specified. Do not paint plastic pipe.
- G. All paint shall be delivered to the project in unbroken containers. Containers shall be labeled to indicate color, directions for use, manufacture, and date of manufacturer. Directions for use of the paint shall be carefully followed in the mixing and general application. All paint shall be applied under dry and dust free conditions. Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started all painting shall be completed without delay.

3.2 PIPING SYSTEM IDENTIFICATION:

- A. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), exterior non-concealed locations and above removable acoustical ceilings.
 - 1. Near each valve and control device.
 - 2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - 4. At access doors, manholes and similar access points which permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
 - 7. On piping above removable acoustical ceilings.

3.3 PAINT SCHEDULE:

- A. All exposed equipment, pipes, conduits, or other appurtenances shall be painted by this contractor with materials and application as specified in the general contract specifications and as directed by the architect.
- B. All concealed pipe covering shall be identified by colored bands and legends. The direction of flow shall be indicated by flow arrows.
- C. All exposed pipe covering shall be totally painted the color of the band color listed below. All exposed pipe hangers, rods, supports, channels, etc. shall be painted flat black.
- D. Color coding strips shall be painted no less than every 15 linear feet plus wherever entering or leaving a space and near valves. (Tape is acceptable). Width of strip shall be approximately 1/5 of the diameter of pipe plus covering if any, but in no case less than 1/2 inch. Color coding shall conform OSHA requirement.
- E. Directions arrow and fluid name shall be applied by sticker at same spacing as above. The stickers shall be secured by color coded tape wrapped two times around the pipe at each end of the label or spring cords.
- F. Standard colors and legends are as follows: (Fire Protection)

PIPING SYSTEM	COLOR	STENCIL IDENTIFICATION
Sprinkler	Safety Red	SPKR
Fire Line	Safety Red	FIRE
Supports, Hangers	Black	---

- G. Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.
- H. Stencil sizes should be as follows:
 - 1. For pipe diameters up to 1", use 1/2" letters
 - 2. For pipe diameters from 1" to 2", use 1" letters

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Student Government Office Renovations
Contract Documents

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3. For pipe diameters from 2" to 6", use 2" letters
4. For pipe diameters over 6", use 3" letters

END OF SECTION 21 02 08

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SECTION 21 05 00 – FIRE PROTECTION

PART 1 - GENERAL

1.1 DEFINITION:

- A. Work under this section of the specifications shall include but not necessarily be limited to items common to sections:
 - 1. 21 05 30 - Wet Standpipe and Sprinkler Systems
- B. In all cases, work specified in this section of the specifications shall be compatible with the above listed specification sections and the requirements of the North Carolina State Construction Office.

1.2 SUBMITTALS:

- A. Shop drawings and system alarm diagrams shall be submitted on all items in accordance with the provisions of Specification Section 21 01 00.
- B. Submit shop drawings on the following.
 - 1. Piping materials
 - 2. Fire protection accessories
 - 3. Water flow indicators
 - 4. Sprinkler heads
 - 5. Valves
 - 6. Hangers
- C. The contract drawings show the general arrangement of the areas to receive fire protection. The fire protection subcontractor shall review the drawings so that all items that will affect the operation of the fire protection system (such as fire detection equipment, air diffuser openings, door openings, lights, fire and smoke dampers, etc) are considered in the design of the system. The shop drawings and associated hydraulic calculations required by the fire protection subcontractor shall be prepared by a NICET level 3 designer using a computer program for sizing of pipes, etc.
- D. The fire protection contractor shall provide CDs of the final approved shop drawings and hydraulic calculations in a PDF format. This CD shall be provided to the Owner, Architect and Engineer.

1.3 COORDINATION:

- A. This subcontractor shall coordinate with the other contractors as required to produce workable, controllable systems. Generally, all controls and equipment shall be furnished and installed by this contractor unless otherwise noted. This contractor shall be licensed for sprinkler work. Specific examples of coordination and cooperation include:
- B. Tie-ins to existing systems and all required auxiliary devices shall be provided by this subcontractor.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION:

3.1 STANDPIPE PIPING SYSTEMS:

- A. Comply with requirements of ANSI/NFPA, 2007 edition for installation of piping materials. Install standpipe piping products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to insure that standpipe piping systems complies with requirements and serves its intended purpose.
- B. Coordinate with other trades as necessary to interface components of standpipe piping properly with other work.
- C. Install drain piping at low points of piping systems.
- D. Install hose outlet valves in piping where hose outlets are indicated.
- E. Install sectional valves in inlet piping, at bottom of each riser, and in loops as indicated.
- F. Install Fire Department connection valves in piping where fire Department connections are indicated.
- G. Install water flow indicators where indicated.
- H. Mount supervisory switches on each sectional valve.

3.2 FIRE SPRINKLER PIPING SYSTEMS:

- A. Comply with requirements of ANSI/NFPA 13, 2007 edition, for installation of fire sprinkler piping materials. Install fire sprinkler piping products where indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that fire sprinkler piping complies with requirements and serves intended purposes.
- B. Coordinate with other work, including plumbing piping, as necessary to interface components of fire sprinkler piping properly with other work.
- C. Install sectional valves in inlet piping at bottom of each riser and in loops as indicated.
- D. Mount supervisory switches on each sectional valve.
- E. Install valved hose connections of sizes indicated, or 3/4" size if not otherwise indicated, on sprinkler at ends of branch lines and cross mains at locations where required.
- F. Install drain piping at low points of fire sprinkler piping.

3.3 ADJUST AND CLEAN:

- A. Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush water feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system, as required to remove foreign substances, under pressure as specified in ANSI/NFPA 13, 2007 Edition. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers.

3.4 FIELD QUALITY CONTROL:

- A. Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for period of 2 hours, at not less than 200 psi or at 50 psi in excess of maximum static pressure when maximum static pressure is in excess of 150 psi. Check system for leakage of joints. Measure hydrostatic pressure at low point of each system or zone being tested.
- B. Repair or replace piping system as required to eliminate leakage in accordance with ANSI/NFPA standards for "little or no leakage," and retest as specified to demonstrate compliance.

3.5 EXTRA STOCK:

- A. General: For each style and temperature range required, furnish additional sprinkler heads, in cabinet according to NFPA 13, 2007 Edition.

END OF SECTION 21 05 00

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SECTION 21 05 30 – WET STANDPIPE AND SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SCOPE:

- A. This work shall consist of furnishing all labor, material, equipment and services necessary for the installation of all equipment specified hereinafter.
- B. Systems, piping and components principally relevant to this section include:
 - 1. Fire Department Valves
 - 2. Water Flow Indicators
 - 3. Pipe and Fittings
 - 4. Valves

1.2 QUALITY ASSURANCE:

- A. Manufacturers:
 - 1. Firms regularly engaged in the manufacture of fire sprinklers and piping accessories of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. NFPA Code:
 - 1. Comply with NFPA No. 13 and NFPA No. 14.
- C. FM Compliance:
 - 1. The contractor shall comply with the seismic requirements of the 2012 NC Building Code Chapter 16 and NFPA-13 2007 edition
- D. UL Labels:
 - 1. Provide fire sprinkler piping products which have been approved and labeled by Underwriters Laboratories.
- E. Local Fire Department/Marshall Regulations:
 - 1. Comply with governing regulations pertaining to fire sprinkler piping.

PART 2 - PRODUCTS:

2.1 FIRE DEPARTMENT VALVES:

- A. 2-1/2" angle valve shall be chrome plated complete with rough brass body, wheel handle, cap and chain, and escutcheon plate. The valve pressure rating shall be based on the maximum fire pump generated pressure.

2.2 SPRINKLER HEADS:

- A. Heads shall be quick response upright, pendant, recessed, or concealed as indicated on the plans and as required for duty performed, and of ordinary degree rating unless otherwise noted.

2.3 WATER FLOW INDICATORS:

- A. Flow indicators shall be provided where shown on the drawings and designed to operate either on drop in pressure or water flow. They must operate reliably on any flow of water amounting to 10 gallons or more per minute, and shall not be subject to false alarms due to water hammer or sudden increase in pressure. A retard element shall be provided, adjustable up to approximately 60 seconds delay. All working parts shall be of corrosion resisting metal. Flow indicators shall be suitable for 175 psi water working pressure and provided with electrical contact unit such as to perform the functions described.

2.4 PIPE AND FITTINGS:

- A. Piping shall be Schedule 10, for sizes 2-1/2" and larger. Piping shall be Schedule 40 for sizes 1" through 2". Fittings shall be black cast iron, Class A. Drain piping above ground shall be galvanized. Piping and fittings subjected to pressures over 175 psi shall be rated at 250 psi.

2.5 VALVES:

- A. All valves shall be butterfly type rated suitable for 175 psi working water pressure.
- B. Riser and sectional control valves shall be butterfly type with integral tamper. Each tamper switch shall be wired to supervisory panel by Electrical Contractor.
- C. Drainage and test valves shall be all-bronze, ball or globe type with screw ends.
- D. Check valves 2 inch and smaller shall be all bronze with screw ends. Check valves 2-1/2 inch and larger iron body, brass mounted with flange ends and non-ferrous metal seat rings and bearings.

PART 3 - EXECUTION:**3.1 TESTING:**

- A. Sprinkler system shall be tested and proved tight under 200 PSI water pressure. All leaks shall be made tight by natural means. No caulking shall be allowed. Contractor shall furnish, connect and operate pump required for testing and shall bear all other expense of tests. The above tests shall be made before painting is done and prior to installation of finished ceilings in areas where pipe is installed above ceiling. This test shall be made prior to making request for final inspection by the Architect. Copies of standard Contractor's Certificate of Test and Material shall be furnished to both the insurance underwriters and the Architect.

3.2 INSTALLATION OF PIPING:

- A. Sprinkler piping shall be installed in strict accordance with NFPA, latest standard.

3.3 VALVES:

- A. Valves shall be installed at all points noted on drawings by standard symbols or as required by best general practice for proper control and operation of the system.

END OF SECTION 21 05 30

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SECTION 21 05 93 – TESTING AND BALANCING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section describes the requirements for testing and balancing of all piping and equipment installed under this contract in the presence of the Engineer and the proper Fire Protection Inspector and prove tight for the periods stated below or longer if required for inspection.
- B. Test in section if deemed advisable.
- C. Disconnect the apparatus for developing the required pressures during the stated periods.
- D. Completely disconnect and remake joints that leak.
- E. No fire protection system or part thereof shall be covered or concealed until after it has been tested and approved.
- F. If such work has been covered or concealed before testing, it shall be exposed for testing.
- G. If tests described in the specifications for fire protection systems differ from requirements or the local inspector, the more rigid requirements shall govern.

PART 2 - PRODUCTS

2.1 SPRINKLER SYSTEM:

- A. Fill and subject to 200 PSIG hydrostatic pressure at the lowest level for (2) hours.

END OF SECTION 21 05 93

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SECTION 21 90 00 – PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS - BUILDING:

- A. Submit as-built drawings as required by General Conditions and obtain written receipt from engineer.

1.2 DEMONSTRATION OF COMPLETE FIRE PROTECTION SYSTEMS:

- A. The following systems shall be put into operation by the fire protection subcontractor furnishing the equipment, and operated for the length of time required to prove proper operation and control.
 - 1. Fire protection systems.
- B. Thoroughly demonstrate and instruct (3) three designated representatives of the Owner in the care and operation of all the fire protection systems and equipment furnished and installed in the contract.
- C. Manufacturers of certain equipment specified herein shall provide technically qualified factory representatives to train the Owner's representative in the care and maintenance and operation of their product. This instruction and service of the factory representative shall be furnished as specified elsewhere in the specifications. This time is in addition to what is specified above and will not be counted as part of this subcontractor's instructions.
- D. The time and place of all training shall be coordinated and scheduled by the subcontractor at the convenience of the Owner and as approved by the architect.
- E. Submit letters signed by the Owner's representatives attesting to the satisfactory completion of all instructions.
- F. System installer shall submit NFPA required Contractor's Material and Test Certificate(s) to the Engineer of Records.

1.3 OWNER'S RIGHT TO TEST SYSTEM:

- A. Should, in the opinion of the architect, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this contract, the right is reserved for the Owner and architect to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the subcontractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the architect.

1.4 OPERATING AND MAINTENANCE MANUALS:

- A. This Division 21 Subcontractor shall carefully prepare an operating instructions and maintenance manual for each fire protection system, including all equipment furnished. The manual shall be submitted to the engineer for approval before final inspection and acceptance is made.
- B. The form in which the operating maintenance manual is to be presented shall be subject to approval by the architect. Three copies of the manual shall be provided.
- C. The following items together with any other necessary and pertinent data shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
 - 1. Suggested settings of all control and switches for normal operation with description of control and its location.
 - 2. A check list for periodic maintenance of all equipment.
 - 3. As-built wiring, interlock, and control diagrams for the equipment, with color coding shown on wiring and interlock diagrams.
 - 4. Part numbers of all replaceable items.
 - 5. Manufacturer's cuts and rating tables for all equipment.
 - 6. Oiling, lubricating and greasing data.
 - 7. Complete electrical load data from operation tests.
 - 8. Test data on all equipment
 - 9. Belt sizes, types, and lengths
 - 10. Serial number of all principal pieces of equipment
 - 11. Valve tag schedule
 - 12. Manufacturers', suppliers' and subcontractors' names, addresses and telephone numbers.

1.5 WARRANTIES:

- A. Deliver to Owner all warranties, etc., and obtain written receipts.

1.6 OBSERVATION REPORTS:

- A. During construction period the engineer will issue observation reports. These items shall be completed before engineer will approve next application for payment. Final punch list work shall be complete before acceptance.

1.7 FINAL INSPECTION AND ACCEPTANCE:

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
 - 1. Submit a list of uncompleted items, if any, and advise when the items will be done.
 - 2. Clean, test, and adjust all systems and equipment.
 - 3. Lubricate all motors.
 - 4. Complete all items on architect's or engineer's pre-final punch list.
- B. Final inspection and tests of the completed construction shall be performed in the presence of the architect or his representative and shall be at such times as are convenient to the architect.

Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for these tests shall be furnished by the subcontractor at his own expense.

- C. Final Clean-up. During construction the subcontractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises to remove all evidence of his work. In addition, upon completion of construction he shall clean, wash, and/or polish all fixtures, equipment, and exposed material and leave them bright and clean.

END OF SECTION 21 90 00

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SECTION 22 01 00 – GENERAL PROVISIONS – PLUMBING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work to be done under Division 22 contracts shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all work as shown on the plans and herein specified, excepting only work materials specified or noted as being furnished or installed by others.
- B. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotation.
- C. The Plumbing contractor for this single prime contract may hereinafter also be referred to as "This Contractor, "PC", or Division 22 Contractor.
- D. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule or architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.
- E. Division of the Specification into sections is for the purpose of simplification alone. Responsibility for the work of various trades shall rest with the Contractor. Various sections of this Division are related to each other as well as the mechanical drawings. Examine all drawings and read all applicable parts of the project manual in order to insure complete execution of all work in this Division, coordinating where required with other trades in order to avoid conflicts.
- F. These specifications and accompanying drawings are intended to cover the furnishing of all labor, materials, equipment and services necessary for the complete installation and acceptable performance of the mechanical systems. Small items of material, equipment and appurtenances not mentioned in detail or shown on the drawings, but necessary for complete and operating systems, shall be provided by this contractor without additional charge to the Owner and shall be included under this contract.
- G. In general, specifications establish the quality of material, equipment and workmanship. The contract documents are intended to secure for the Owner, a first class installation in every respect. Labor shall be ready for satisfactory and efficient operation.
- H. The contractor shall carefully examine the drawings and specifications before accepting the contract. He shall call attention to any changes or additions which, in his opinion, are necessary to make possible the fulfillment of any guarantee called for by these specifications; failing which, it shall be deemed that he has accepted full responsibility for all such guarantees.
- I. The contractor shall put his work in place as fast as is reasonably possible. He shall, at all times, keep a competent foreman in charge of the work, to make decisions necessary for the diligent advancement of the work. The Contractor shall facilitate the inspection of the work by the Owner's Representative.
- J. The Contractor shall coordinate all Plumbing related work in the building in order to facilitate intelligent execution of the work. He shall also remove any rubbish as expeditiously as possible.

- K. Materials or products specified herein and/or indicated on the drawings by trade names, manufacturer's names or catalog numbers establish the quality of materials or products to be furnished.
- L. Points of connection or continuation of work under this contract are so marked on drawings or herein specified. In case of any doubt as to the required exact location of such points, the Owner's Representative shall decide and direct.
- M. The plumbing contractor shall provide water services, including backflow protection, for HVAC equipment requiring same, and shall terminate service with a shutoff valve. The mechanical contractor shall make the final connections to the equipment and provide the interconnecting piping to the backflow preventer.

1.2 SPECIALTY SCOPE OF WORK INCLUDED

- A. The plumbing contractor shall include in the base bid and alternate bids all costs and time for himself, his control subcontractor and his test and balance subcontractor to accomplish the scope of work. Work under the plumbing contract shall include, but shall not be limited to, the furnishing, unloading, handling, distribution, setting and installation of all components required for the following systems:
 - 1. Water service (interior to the building)
 - 2. Sanitary sewers (interior to the building)
 - 3. Special drainage work as hereinafter specified
 - 4. Hot and cold domestic water systems
 - 5. Piping Specialties
 - 6. Insulation on plumbing systems
 - 7. Plumbing fixtures
 - 8. Rough-in and final connections
 - 9. Miscellaneous items as specified, required and/or shown on drawings
 - 10. All vents, safety valves, vacuum breakers, drain and piping systems as required by applicable

1.3 RELATED WORK WHICH IS A PART OF SECTION 22 01 00

- A. All work done under this section of the specification is subject to the Architect's instructions to bidders, general conditions and their corresponding supplements.
- B. Refer to the supplementary general conditions of these specifications for temporary services and facilities that shall be provided.

1.4 DEFINITIONS

- A. "Piping": Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents, and items customarily required in connection with the transfer of fluids.
- B. "Ductwork": All air delivery, recirculation and exhaust ducts, whether of sheet metal or other material, and includes all connections, accessories, and appurtenances necessary for and incidental to a complete system.
- C. "Provide" (P): Furnish and install complete ready for use.

- D. "Furnish" (F): Purchase and deliver to the project site complete with every necessary appurtenance and support.
- E. "Install"(I): Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation of the proper location in the project.
- F. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double partitions of hung ceilings, in crawl spaces, in shafts.
- G. "By Other Trades": Shall mean by persons or parties who are not anticipated to be the Plumbing Contractor this trade working together with the general contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall contract.

1.5 ABBREVIATIONS

- A. Abbreviations are as follows:

1.	AD	Access Door
2.	AFF	Above Finish Floor
3.	AMP	Amperes
4.	AP	Access Panel
5.	AV	Air Vent
6.	BWV	Back Water Valve
7.	BO	By Others
8.	C	Conduit
9.	CAB	Cabinet
10.	CB	Catch Basin
11.	CI	Cast Iron
12.	CL	Ceiling
13.	CO	Clean Out (F-Floor)(W-Wall)(Y-Yard)
14.	CONTR	Contractor
15.	CP	Circulating Pump
16.	DB	Decibels
17.	DIS.SW	Disconnect Switch
18.	DN	Down
19.	ELEC	Electrical
20.	FD	Floor Drain
21.	FL	Floor
22.	HB	Hose Bibb
23.	I	Install
24.	IE	Invert Elevation
25.	MH	Manhole
26.	NC	Noise Criteria
27.	P	Provided (Furnished & Installed)
28.	PLBG	Plumbing
29.	UF	Underfloor
30.	UG	Underground
31.	WC	Water Closet
32.	Ø or PH	Current Phase

1.6 INTERPRETATION OF CONTRACT DOCUMENTS

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to a specific element of work, take precedence over the specifications where they may conflict.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.
- D. The drawings of necessity utilize symbols as schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specification only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.7 DELINEATION OF WORK

- A. The plumbing contractor is required to supply all necessary supervision and coordination of information to any others who are performing work to accommodate plumbing installations. Where the plumbing contractor is required to install items which he does not purchase, he shall include for such items:
 - 1. The coordination of their delivery.
 - 2. Their unloading from delivery trucks driven in to any designated point on the property line.
 - 3. Their safe handling and field storage up to the time of permanent placement in the project.
 - 4. The correction of any damage, defacement or corrosion to which they may have been subjected.
 - 5. Their field assembly and internal connections as may be necessary for their proper operation.

- 6. Their mounting in place including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions.
 - 7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.
- B. Items which are to be installed but not purchased as part of the work of the plumbing contractor shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The work under this contract shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.
- C. The specifications for the overall construction delineate various items of work under separate section headings. The list below set forth this delineation to the extent that it affects the plumbing work category. In the absence of more detailed information, this list shall be taken as a specific instruction to the plumbing contractor to include the work assigned to him. Indications that each contractor is to perform the work means that it is to perform the work for its own accommodation only, except as specifically noted otherwise.

"P" indicates Provide, "F" indicates Furnish, "I" indicates Install			
Item	"General"	"Plbg"	"HVAC"
Power wiring for plumbing equipment	Refer to Section 22 01 04		
<u>EXCEPTION:</u> Refer to notes on drawings.			
Hoisting		P	
Rigging		P	
Cutting and Patching		P	
<u>EXCEPTION:</u> Cost where due to late installation or improper coordination of work is the responsibility of the delinquent contractor. Locations shall be approved by structural engineer.			
Framed slots and openings in walls, decks and slabs		P	
<u>EXCEPTION:</u> Coordination drawings are required from plumbing contractor.			
Sleeves through non-membraned slabs, decks and walls		P	
<u>EXCEPTION:</u> Refer to Division 03 for coordination of installation.			
Sleeves through membraned slabs, decks and walls		P	
<u>EXCEPTION:</u> Refer to Division 03 for coordination of installation.			

"P" indicates Provide, "F" indicates Furnish, "I" indicates Install			
Item	"General"	"Plbg"	"HVAC"
Fireproof sealing of excess opening in slabs, decks and fire rate walls		P	
Excavation and backfill of trenches inside building		P	
EXCEPTION: Specifications and drawings delineate exceptions.			
Keeping trench excavations free from water during construction		P	
EXCEPTION: The general contractor shall be responsible for keeping the entire site free from surface water.			
Fastenings		P	
Supports		P	
Field touch-up painting damaged shop coats		P	
Finish painting of exposed work		P	
EXCEPTION: Painting of equipment, piping etc. in mechanical spaces provided by plumbing contractor. The plumbing contractor shall prime all exposed piping, etc. in finished spaces.			
Finished wall and ceiling access doors, panels and support frames	I	F	
EXCEPTION: Plumbing contractor shall supply and locate all required access doors to the installing trade.			
Domestic make-up water piping for heating and air conditioning system		P	
EXCEPTION: Final connection provided by HVAC contractor.			
Removal of spray on fire proofing from plumbing equipment, hangers, etc.	P		
Rubbish Removal		P	
EXCEPTION: Where one trade furnishes and another installs, the installing trade shall remove the shipping and packing material which accumulate.			
Special tools for equipment maintenance		P	
Piping and associated work outside of the building line		P	

"P" indicates Provide, "F" indicates Furnish, "I" indicates Install			
Item	"General"	"Plbg"	"HVAC"
<u>EXCEPTION:</u> Rough-in and final connection shall be provided by the plumbing contractor providing specified services.			

- D. This plumbing contractor is required to supply all necessary supervision and coordination of information to any others who are supplying work to accommodate his installation.

1.8 STANDARDS AND CODES

- A. Nothing in this specification shall be interpreted to conflict with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction."
- C. All equipment with electrical components shall bear the UL label.
- D. The following minimum standards apply wherever applicable:
 - 1. ANS American National Standards
 - 2. ASTM American Society for Testing Materials
 - 3. NEMA National Electrical Manufacturers Association
 - 4. NFPA National Fire Protection Association
 - 5. OSHA Occupational Safety and Health Act
 - 6. AGA American Gas Association
 - 7. ASA American Standards Association
 - 8. AWWA American Water Works Association
 - 9. CISPI Cast Iron Soil Pipe Institute
 - 10. NBFU National Board of Fire Underwriters
 - 11. PDI Plumbing and Drainage Institute

1.9 INSPECTION AND COOPERATION

- A. All work shall be done under the periodic observation of and to the complete satisfaction of the Architect. No deviations from the Drawings and Specifications will be allowed without prior written approval of the Architect. The plumbing contractor shall cooperate with the other contractors to allow for the installation of their work as well as his own.
- B. The plumbing contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this contractor without regard for other work, or if a conflict results, must be changed if directed by the Architect or Engineer without additional cost to Owner or his agents.
- C. Relocation of equipment, piping, system connections or rough-in locations up to ten feet (10') in any direction, if necessary, shall be done at no additional cost to the Owner or his agents upon notification, or as determined by the preparation of fabrication or coordinated shop drawings, prior to installation.

- D. All concealed work shall be inspected by the Architect or his appointed representative before being concealed. Plumbing Contractor shall call for inspection at least two (2) work days before concealment.
- E. The Architect shall have the right to inspect the work whenever advisable in his judgment. The plumbing contractor shall have a representative present at each inspection and shall give such assistance as may be required.
- F. Recommendations made by the Architect shall be promptly carried out and all unsatisfactory material and workmanship replaced at once to the Architect's satisfaction at the contractor's expense.
- G. The plumbing contractor shall be responsible for hoisting of all materials and equipment furnished under as part of his portion of the work in accordance with all State, and Federal rules and regulations.
- H. Engineer's Response to RFIs
 - 1. Due to the technical and aesthetic nature of this project, the plumbing contractor shall be pro-active in his understanding of work efforts to allow the engineer a minimum of 10 working days to respond to RFIs without consideration of time delay to the project schedule.

1.10 TEMPORARY SERVICES AND FACILITIES

- A. Refer to general requirements for temporary services and facilities that shall be provided.

1.11 UNIT PRICES

- A. Refer to general requirements relative to "Add" or "Deduct" prices relative to this contract.

1.12 ROCK DEFINITION

- A. Refer to Division 31 for definitions and requirements relative to rock encountered during excavation.

1.13 SUBMITTALS

- A. LIST OF MANUFACTURERS:

- 1. Within twenty days following award of contract, the plumbing contractor shall submit the required information pertaining to the equipment and materials he will be furnishing, commencing with the list of manufacturers for approval by the engineer. Following up in short order shall be the shop drawings and other documents. The Owner and his representatives reserve the right to reject as unacceptable any items for which, in their judgment, they have not been allowed adequate lead time in which to investigate suitability, or their experience has proved the service or equipment unsatisfactory.

Section	Item	Manufacturers		
22 02 08	Identification	Seton	Calpico	SSC
22 05 10	Pipe	Republic Steel	National Tube	Youngstown
22 05 10	Fittings	Tube-Turn	Grinnell	Ladish
22 05 10	Vacuum Breakers	Bidero	Watts	Wilkins
22 05 10	Pipe Thread Compound	Crane	Dixon	Rutland
22 05 12	Sleeves	Pipe Shields	R&S Mfg	Clow
22 05 12	Hangers	Modern	F&S	Grinnell
22 05 12	Escutcheon	U.S. Brass	Brass Craft	Central Brass
22 05 12	Fire Sealant	ChaseFoam	3M	Proset
22 05 12	Access Doors	Milcor	Acorn	Sioux Chief
22 05 12	Pipe Supplies	F&S	F&M	Grinnell
22 05 12	Reduced Pressure Backflow Preventer	Wilkins	Watts	Febco
22 05 23	Valves	Hammond	Jenkins	Fairbanks
22 05 23	Circuit Setters	B&G	Taco	Thrush
22 05 23	Butterfly Valves	Demco	Monarch	Dover
22 05 23	Silent Check Valves	William and Hager	Watts	Ames
22 05 48	Seismic Restraints	Mason	Grinnell	Uni-Strut
22 07 00	Insulation	Certainteed	Owens-Corning	Knauff
22 07 00	Insulation Mastic	Benjamin & Foster	Armstrong	3M
22 13 01	Thermometers	Weksler	Palmer	Trelice
22 21 13	Specialties	B&G	Taco	Armstrong
22 21 13	Unions	Grinnell	Watts	Wilkins
22 21 13	Safety Valves	Lonegran	Kunkle	Crane
22 21 13	Strainers	Watts	Febco	Hammond
22 40 00	Plumbing Fixtures	Crane	Kohler	American Standard
22 40 00	Plumbing Trim	Delta	Kohler	T & S Brass

1.14 SHOP DRAWINGS

- A. Equipment shop drawings shall include service space requirements, manufacturer's equipment installation brochure and all noise and vibration information.
- B. Prior to purchasing any equipment or materials, the approved list of the manufacturers shall be returned by the Engineer to the plumbing contractor.
- C. Shop drawings shall be submitted conforming to the requirements stated in supplementary conditions and Division I for the items indicated throughout the following specifications:
- D. Documents will not be accepted for approval unless:
 - 1. They comply with the requirements of the supplement to the General Conditions.
 - 2. They include complete information pertaining to appurtenances and accessories.
 - 3. They are submitted as a package where they pertain to related items.

4. They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 5. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
 6. The submittal is stamped approved by the Plumbing contractor and contain no other markings.
- E. Approval of shop drawings does not invalidate the plans and specifications if in conflict unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

1.15 FABRICATION / COORDINATION DRAWINGS

- A. Due to the complexity of the review, the fabrication / coordination drawings and controls and instrumentation shop drawings shall be submitted early enough to allow a 30 day review period followed by a second 30 day review period of shop drawing review and comments. Spacing of submittals shall be at no less than 15 working days.
- B. Fabrication drawings are not shop drawings but are reviewed by the engineer but are not approved as typical for a shop drawing. Until submitted to the engineer and to a point in time when all engineer review comments are reconciled on these drawings by the contractor, \$10,000.00 will be retained from the plumbing portion of the application for payment.
- C. The contractor shall submit to the A/E all coordination drawings and fabrication drawings in packages as specified here. Hard copy documents will be reviewed by the A/E and returned with written comments.
- D. Following up within 5 working days after the return of these documents at the office of the construction manager, all parties will meet to resolve conflicts.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials used in this work shall be new unless otherwise noted. All materials used on this project shall be listed and labeled by one of the third party agencies which have been approved by the U.L. building authority housing jurisdiction to safety test and label electrical and mechanical equipment. Any material installed that is not labeled shall be subject to a field evaluation by one of these approved agencies, at the contractor's expense, if requested by the authority having jurisdiction or the engineer. Any item not approved by the agency shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are labeled.

2.2 MATERIALS AND MANUFACTURERS

- A. All equipment and materials required for installation under these specifications shall be new manufactured and without blemish or defect. All equipment shall bear labels attesting to Underwriter Laboratories approval where subject to Underwriters Laboratory label service.

Where no specific indication as to the type of material or equipment is indicated a first class standard article shall be furnished.

- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. It is the intent of the specifications that wherever manufacturers of a product are specified any substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction such as lesser heat exchange surface, etc.). Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases equipment is oversized to allow for pick-up loads which cannot be delineated under the minimum performance.
- C. Substituted equipment where permitted or approved, must conform to space requirements, whether approved or not or shall be replaced at the plumbing contractor's expense. Any modification of related systems as a result of substitutions shall be made at the plumbing contractor's expense.
- D. Note the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Engineer, Architect, or any other Owner's Representative, attests to the dimensional accuracy or the ability of the material or equipment involved or the mechanical performance of the equipment.

2.3 SUBSTITUTION OF SPECIFIED MATERIALS

- A. It is the purpose of this specification not to exclude competition between manufacturers of similar equipment.
- B. Where items are specified as "or approved equivalent" prior approval must be obtained from the Engineer. Said approval does not intend to obligate the Engineer in the event shop drawings submitted do not indicate equality of materials, workmanship or function and the right to reject substitutes shall remain the prerogative of the Engineer.
- C. In all cases regardless of method of submission, the plumbing contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed. Minor modifications to suit standard manufactured items are acceptable if approved by Engineer.
- D. Should contract documents fail to describe particular materials or goods to be used, then it shall be the duty of plumbing contractor to inquire of Engineer as to what is to be used and to supply it at plumbing contractor's expense.
- E. Plumbing Contractor shall promptly remove, at own expense, rejected materials from site of work.
- F. When material has been approved, no change in brand or make will be permitted without approval of Engineer.

2.4 RECORD DRAWINGS

- A. Purchase and maintain at the job site a complete and separate set of prints of the approved working Drawings on which to accurately indicate daily progress by coloring materials and apparatus as installed. Schedules shall be modified to reflect data consistent with that of the installed equipment. Clearly show all changes to the work as a result of change orders, instruction issued by the Architect or conditions encountered in the field. Accurately indicate the location, size, type and elevation of new utilities and their relationship to existing utilities.
- B. The marked-up and colored-in prints will be used as a guide for determining the progress of the work installed. They shall be inspected at the architect's discretion and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment may not be approved until the drawings are accurate and up-to-date.
- C. The plumbing contractor shall provide one set of marked plans to the Engineer for his review and approval of record drawings. The approved plans shall be used by the Engineer for CADD preparation of as-built documents using AutoCad 2010 to indicate correct location of all equipment, piping, etc. as installed on project.
- D. The drawings shall provide an accurate and complete record of the work as installed.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. Workmanship shall be of best quality. Good appearance of finished work shall be of equal importance with its mechanical efficiency. No make-shifts shall be permitted anywhere in work and all portions of work shall be so laid out and installed that work as a whole is of uniform quality and appearance.

3.2 PROTECTION OF EQUIPMENT

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.
- D. The plumbing contractor shall be responsible for the work damaged by him in executing this contract. Any work damaged by the plumbing contractor shall be replaced by him and placed in perfect condition without extra cost.

3.3 CONTIGUOUS WORK

- A. If any part of the plumbing contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, the contractor shall examine and measure such contiguous work and report to

the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should plumbing contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

3.4 CERTIFICATES OF INSPECTION AND APPROVAL

- A. Upon completion of work, plumbing contractor shall furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.5 SLEEVES AND OPENINGS

- A. All sleeves and openings required shall be located and provided by the plumbing contractor for his portion of the work. Core drilling for missed sleeves shall be provided by the delinquent contractor.
- B. In order to minimize liquid leakage or transfer of air between floors, it is the intent that pipe penetrations of floors (except in plumbing chases) be held to a minimum. Where it is necessary to penetrate floors, the pipe shall pass through sleeves set in the concrete, and the space between the pipe and sleeve shall be caulked to make it air tight.

3.6 ACCESS TO EQUIPMENT AND VALVES

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.
- C. Where devices are to be concealed in walls or above non-removable ceilings, the plumbing contractor shall furnish the required access panels to the GC for installation for their respective equipment.
- D. Size of panels shall be 12" x 12" square for all wall panels and 24" x 24" for ceiling panels.

3.7 COORDINATION

- A. The plumbing contractor is cautioned that portions of the building have an unusually high quantity of piping, ducts, conduits, and other mechanical equipment, and space is limited. The contractor shall offset pipes as required to avoid interference at no additional cost to the Owner. Generally pipes in which grade must be maintained, such as waste and storm drain piping, and sprinkler piping, shall have first priority. Other pipes shall be offset as required to avoid those items. The HVAC contractor will be required to prepare coordinated shop drawings of the ductwork. The Plumbing Contractor will be furnished copies of these drawings and shall use them for his coordination drawing efforts and in determining pipe routing.
- B. The HVAC contractor will make the basic duct drawings and send sepias to the plumbing contractor. Within 30 days after receiving the sepias and "CADD disk", the plumbing contractor

shall return them to the mechanical subcontractor, marked to show how plumbing pipes cross the ducts, and with suggested pipe elevation for each pipe. The HVAC contractor will use this information plus similar information received from other contractors to prepare the finished coordination drawings.

- C. The HVAC contractor shall provide manufacturers installation drawings as shipped with equipment, field working and location drawings, coordination drawings, wiring diagrams as required to show information required for information and coordination of the work for other trades. This includes locations of equipment, sleeves, foundations, curbs, pipe connections, wiring connections, etc. These drawings shall be provided in advance of work in the area so that the necessary coordination can be done at the proper time. The drawings shall be submitted to the A/E for record only and other subcontractors involved in the work.
- D. The HVAC contractor shall coordinate the work of his trade and other trades in order that interference between plumbing, mechanical, electrical, architectural and structural work will be avoided. Piping, ducts, conduits, etc. shall be kept as close as possible to ceiling, walls, columns, etc. in order to take up the minimum amount of space; and all offsets, fittings, etc. required shall be furnished without additional cost to the Owner. In case interferences develop, the Engineer will decide which equipment shall be relocated regardless of which was first installed.
- E. Minor changes required by Owner, and any incidental changes required to meet structural conditions or to match trim etc. shall be made by this contractor without extra cost to the Owner. Generally, all pipes, and conduits except those in the equipment room and in other locations specifically designated on the plans shall be run concealed in furrings and chases. In the event that it is necessary to expose these items in finished areas, this shall be called to the Architect's attention before proceeding with the work.
- F. The plumbing contractor shall cooperate closely with the General Contractor and all other contractors on the job in order that the job will progress smoothly to its completion. He shall lay out his pipe in advance of pouring floors, or installing walls, shall provide to the General Contractor the location and size of any openings he may require, and shall furnish for the installation by the General Contractor any sleeves, forms, inserts, or hangers required for his work. In the event of failure to do these things at the proper time, or improper location of the required items, the cutting and patching required to rectify the errors shall be done by the plumbing contractor who installed the original material being cut but shall be paid by the contractor at fault, as determined by the Engineer, at no additional cost to the Owner.
- G. All equipment shall be installed with sufficient access and clearance for maintenance, repairs, and replacement. In the event that it appears necessary to install equipment without proper access or clearance, the work shall be stopped until written permission is received from the Engineer to install the equipment. Pipes shall be installed in such a way as to allow maximum headroom where pipes are in occupied areas. Valves shall be located in such a position that they are easily accessible and so that the valve wheels can be easily turned to full open or full closed positions.

3.8 CHASES, CUTTING AND PATCHING

- A. In new construction, chases in walls for any work to be installed by the plumbing contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the general contractor's work.

- B. If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, the delinquent plumbing contractor shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.
- C. The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure or any part thereof. The Plumbing contractor's shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting from cutting shall be under the supervision of the Superintendent of the General Contractor.

3.9 DISCREPANCIES

- A. In the event of discrepancy, immediately notify the architect for clarification and resolution.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.10 JOB CONDITIONS

- A. Safety: Observe all required safety regulations and the manufacturer's warnings and instructions during the storage, handling and applications of materials.
- B. Necessary precautions shall be taken to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion or other harm.
- C. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at the end of each day's work, in accordance with all applicable federal, state, and local codes.

END OF SECTION 22 01 00

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SECTION 22 02 06 - ROUGH-IN AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Rough in for all items of equipment that require waste, vent or water connections, regardless of which contractor furnished the equipment.
- B. Make final connections to those items for equipment furnished by others except where specifically designated on the drawings or in these specifications otherwise.
- C. Generally, final connections to equipment shall be by the plumbing contractor.
- D. Generally, final connections to water heaters, and other equipment of this type will be by the plumbing contractor.
- E. The plumbing contractor shall be responsible for verifying that any shut-off, pressure regulator and backflow prevention devices is included with equipment or furnishing the same if is not, when connecting services to any specialized equipment.

1.2 ROUGH-IN DRAWINGS

- A. The plumbing contractor shall secure from each contractor furnishing items of equipment (requiring plumbing connections) roughing-in prints and complete detail shop drawings of all equipment, and review at the job each area with the respective contractor before roughing-in. Make all adjustments as required. In the event that the plumbing contractor fails to obtain the roughing-in prints for whatever reason, and roughs in the pipes at the wrong location, the pipes shall be relocated as required at the expense of the plumbing contractor. In the event that the plumbing contractor roughs in the pipes in accordance with prints furnished by the respective contractor, and it turns out that the pipes are in the wrong locations, any costs of relocating the roughed-in pipes will be paid by the contractor furnishing that item of equipment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials shall be the same as are described in the specifications for the various piping systems.

END OF SECTION 22 02 06

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SECTION 22 02 08 – PLUMBING IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 SCOPE

- A. All exposed pipe, hangers, and equipment installed by this subcontractor shall be painted unless it has a factory finish or is noted otherwise. Exposed chromeplated brass, stainless steel, or plastic piping will not be painted.
- B. Type of identification devices specified in this section include the following:
 - 1. Plastic Pipe Markers
 - 2. Plastic Tape
 - 3. Valve Tags
 - 4. Valve Schedule Frames
 - 5. Engraved Plastic-Laminate Signs

1.2 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacturer of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.3 SUBMITTALS

- A. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags," in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 22.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE MARKERS

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color-coded, plastic-sheet pipe markers, complying with ANSI A13.1.

- B. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 2. Adhesive lap joint in pipe marker overlap.
 3. Laminated or bonded application of pipe marker to pipe (or insulation).
 4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1-1/2".
- C. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
1. Laminated or bonded application of pipe marker to pipe (or insulation).
 2. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
 3. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.
- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
- E. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 PLASTIC TAPE

- A. Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.
- B. Width: Provide 1-1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2-1/2" wide tape for larger pipes.
- C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.3 VALVE TAGS

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1-1/2" diameter tags, except as otherwise indicated.
- B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.4 VALVE SCHEDULE FRAMES

- A. For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on walls. Provide frames of rigid plastic or metal, with plastic glazing.

2.5 ENGRAVED PLASTIC-LAMINATE SIGNS

- A. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 LETTERING AND GRAPHICS

- A. Coordinate names, abbreviations and other designations used in mechanical identification work with corresponding designations shown pre-existing, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer's or as required for proper identification and operation/maintenance of mechanical systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H).

2.7 PAINT

- A. All products shall be in accordance with the specifications for painting in the general contract.

PART 3 - EXECUTION

3.1 GENERAL

- A. Any equipment shipped with a factory applied finish shall be touched up to repair any damage to the finish so that it is the same as new.
- B. In the mechanical equipment rooms the plumbing contractor shall be responsible for painting all piping, equipment, and accessories installed under their respective contract.
- C. In other parts of the buildings items which are in place in finished areas when general building painting is done will be painted by the General Contractor. Items installed after painting is completed shall be painted by the plumbing contractor, as directed by the architect.
- D. All exposed nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the plumbing systems shall be painted with two coats of enamel.
- E. All exposed piping including insulated piping, insulated by this contractor shall be painted two coats of lead and oil paint. Elastomeric pipe insulation shall have two coats of enamel of the type recommended by the insulation manufacturer.

- F. Do not field paint exposed copper pipe, brass valves, or brass trim on iron body valves, or machinery or equipment that has a factory applied finish unless otherwise specified. Do not paint plastic pipe.
- G. Painted pipes which are buried in earth, shall be allowed to dry before backfilling.
- H. All paint shall be delivered to the project in unbroken containers. Containers shall be labeled to indicate color, directions for use, manufacture, and date of manufacturer. Directions for use of the paint shall be carefully followed in the mixing and general application. All paint shall be applied under dry and dust free conditions. Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started all painting shall be completed without delay.

3.2 PIPING SYSTEM IDENTIFICATION

- A. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), exterior non-concealed locations and above removable acoustical ceilings.
 - 1. Near each valve and control device.
 - 2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - 4. At access doors, manholes and similar access points which permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
 - 7. On piping above removable acoustical ceilings.

3.3 PAINT SCHEDULE

- A. All exposed equipment, pipes, conduits, or other appurtenances shall be painted by this sub-contractor with materials and application as specified in the general contract specifications and as directed by the architect.
- B. All concealed pipe covering shall be identified by colored bands and legends. The direction of flow shall be indicated by flow arrows.
- C. All exposed pipe covering shall be totally painted the color of the band color listed below. All exposed pipe hangers, rods, supports, channels, etc. shall be painted flat black.
- D. Color coding strips shall be painted no less than every 15 linear feet plus wherever entering or leaving a space and near valves. (Tape is acceptable). Width of strip shall be approximately 1/5 of the diameter of pipe plus covering if any, but in no case less than 1/2 inch. Color coding shall conform OSHA requirement.
- E. Directions arrow and fluid name shall be applied by sticker at same spacing as above. The stickers shall be secured by color coded tape wrapped two times around the pipe at each end of the label or spring cords.
- F. Standard colors and legends are as follows for plumbing.

3.4 PIPE IDENTIFICATION

- A. Piping systems in mechanical rooms shall be completely painted with the applicable colors listed below and have appropriate self-sticking or strap-on identifications and arrows indicating direction of flow. Piping and ducts in chases above ceiling, etc. shall be color banded and have stencil markings at appropriate intervals. On straight runs of piping, markings should be no further than 30 feet apart; and stencil identifications, color bands, and direction arrows shall be near each valve, pressure reducing valve, heat exchanger, etc. Where pipe passes through walls or floors, marking shall be near the penetration on both sides. Markings shall be at each directional change of all piping systems. Mechanical room pipe color and the color of bands are to be as follows:

	<u>PIPING SYSTEM</u>	<u>STENCIL COLORS</u>	<u>IDENTIFICATION</u>
1.	Water, Cold Domestic	Safety Green	DOM CW
2.	Water, Hot Domestic	Safety Green	DHW
3.	Water, Hot Domestic Recirculating	Safety Green	DHWR
4.	Supports, Hangers	Black	

- B. Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.
- C. For insulated pipe systems, stencil sizes should be as follows:
1. For pipes up to 1 inch, use 1 inch letters.
 2. For pipes 1 inch to 2 inches, use 2 inch letters.
 3. For pipes 2 inches to 6 inches, use 3 inch letters.
 4. For pipes above 6 inches, use 4 inch letters.
- D. For un-insulated systems, stencil sizes should be as follows:
1. For pipe diameters up to 1 inch, use 1/2 inch letters.
 2. For pipe diameters from 1 inch to 2 inches, use 1 inch letters.
 3. For pipe diameters from 2 inches to 6 inches, use 2 inch letters.
- E. Valve handle shall be painted the same color as the stripes on the pipe.

3.5 VALVE IDENTIFICATION

- A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.

3.6 PLUMBING EQUIPMENT IDENTIFICATION

- A. Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

- B. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
- C. Pumps and similar motor-driven units.
- D. Lettering Size: Minimum 3/8" high lettering for name of unit where viewing distance is less than 2'-0", 3/4" high for distances up to 6'-0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 the size of principal lettering.
- E. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, and warn of hazards and improper operations.
- F. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.

END OF SECTION 22 02 08

SECTION 22 05 10 – PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work shall consist of furnishing all labor, material, equipment and services necessary for the installation of all equipment specified hereinafter.
- B. Systems, piping and components principally relevant to this section include:
 - 1. Sanitary and Storm Water Piping
 - 2. Vent Piping
 - 3. Domestic Water Piping
 - 4. Other items where shown on the drawings or as specified.

1.2 SUBMITTALS

- A. Shop drawings shall be submitted on all items in accordance with the provisions of specification Section 22 01 00.

PART 2 - PRODUCTS

2.1 SANITARY AND STORM WASTE PIPING

- A. All interior waste piping below grade and to a point five (5) feet outside the building shall be centrifugally cast, weight bell and spigot cast iron pipe. All fittings shall be of same weight, bell and spigot cast iron. All cast iron piping and fittings shall meet the latest standards and specifications of the Cast Iron Soil Pipe Institute (CISPI) and of the American Society for Testing and Materials (ASTM).
- B. All interior waste piping 2" and larger above grade shall be non-hub or hub & spigot service weight cast iron pipe. Fittings shall be service weight cast iron.
- C. All interior waste piping 1 1/2" and smaller above grade shall be galvanized wrought iron with galvanized cast-iron drainage fittings. Copper DWV piping and fittings will be acceptable.
- D. Long turn drainage fittings shall be used in all cases except where space limitations make their use impractical.

2.2 VENT PIPING

- A. Vent piping 2 inches and larger shall be service weight cast iron soil pipe with service weight cast iron fittings.
- B. Vent piping below grade shall be service weight cast iron bell and spigot pipe with service weight cast iron fittings. Minimum vent pipe size below grade shall be two (2) inches in diameter.

2.3 DOMESTIC WATER PIPING

- A. Pipe material for above ground installation shall be type "L" hard drawn copper tubing with 125 psi solder joint wrought copper fittings.
- B. Pipe material for below ground installation, inside the building shall be Type "K" hard drawn copper tubing without fittings or joints. Solder and flux shall be lead free.
- C. Solder for joints 1½" and larger shall be silver soldered joints. Smaller than 1½" shall be soldered with 95-5. Joints for potable water piping shall use lead free solder and flux.
- D. Fittings for copper pipe shall be wrought copper.
- E. All exposed piping in finished room (including cabinets) used in connection with plumbing fixtures shall be chromium plated brass pipe with plated cast brass fittings.

2.4 COMPOUNDS, SOLDER AND LEAD

- A. Pipe Thread Compound:
 - 1. Crane, Dixon, Rutland, or equal, or Teflon tape type.
 - 2. Solder-joint solder: 95% tin and 5% antimony. Joints on larger pipe shall be made with a high-temperature brazing solder, Sil-phos or equal, except use 95-5 at valves.
- B. Asphaltic Joint Compound:
 - 1. G-K Jointite, Korite or equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. For purposes of clearances and legibility, the contract documents are essentially diagrammatic and, although size and location of piping are drawn to scale wherever possible, contractor shall make use of all data in all of the contract documents and shall verify this information at building site.
- B. The contract documents indicate required size and points of termination of pipes and suggest proper routes of piping to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that the contract documents indicate all necessary offsets, and it shall be the work of this section to install piping in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner. The contractor shall fully inform himself regarding any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. He shall exercise due and particular caution to determine that all parts of his work are made quickly and easily accessible. Although the locations of the equipment and piping may be shown on the contract documents in certain positions, the contractor shall be guided by the architectural details and conditions existing at the job, correlating this work with that of others. Provide all offsets as required to produce a neat, workmanlike arrangement.

- C. The contractor shall study all drawings and specifications to determine any conflict with ordinances and statutes. Any errors or omissions shall be reported, and any changes shall be shown in drawings made by this section, and any additional work performed at no additional cost to the Owner.
- D. Submittal of bid shall indicate the contractor has examined the site and contract documents and has included all required allowances in his bid. No allowance shall be made for any error resulting from contractor's failure to visit job sites and to review contract documents and bid shall include costs for all required drawings and changes as outlined above, all at no additional cost to the Owner.
- E. All piping shall be installed to prevent unusual noise from the flow of water under normal conditions. Insert one (1) inch strip of hair felt to isolate all piping from any direct contact with any part of the building, framing, conduit, etc.
- F. Springing, bending or forcing of pipe shall not be allowed. Use fittings for all offsets or changes in alignment of piping. Center hubs so cast iron or clay pipe shall lay straight without pinched joints.
- G. All changes in directions shall be made with approved fittings. Mitering, saddling or welding of smaller pipe and larger piping is prohibited.
- H. Pipe openings shall be closed with caps or plugs during installation. Rags and tin cans are not considered suitable closures. Pipe openings in terrazzo floors shall have semi-permanent closures during construction.
- I. Damage by leaks - These contractor's shall be responsible for damage to the grounds, walks, road, buildings, pipe systems, electrical systems and their equipment and contents, caused by leaks in the piping system being installed or having been installed herein. He shall repair at his expense all damage so caused. All repair work shall be performed as directed by the Architect.
- J. The use of chemicals or so-called "Stop-Leak" compounds shall not be permitted at any time.
- K. Unions shall be provided at connection to all equipment.
- L. Escutcheon plates shall be provided at all penetrations of walls, ceilings, floors, etc.
- M. All items of equipment and plumbing fixtures shall be provided with approved vacuum breakers to prevent backflow, as required by State Health Department and local authorities having jurisdiction. All waste connections shall be installed with approved airbreak fittings to comply with the above requirements. Vacuum breakers where shown on Drawings or required shall be angle pattern with built-in lift type check valves as manufactured by Bidoro Manufacturing Company or approved equal.
- N. Bypass Piping: Except as otherwise indicated, fabricate and install bypass piping using same materials and in same plane as connected piping, but one pipe size smaller. Include valve in bypass piping. Install bypass piping around control valves, PRV stations and as shown on drawings.

3.2 PIPE JOINING METHODS

- A. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or

pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

- B. Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B31. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

3.3 SANITARY WASTE PIPING

- A. Joints above grade shall be no-hub coupling consisting of an approved (ASTM C-1540) elastomeric sealing sleeve and Type 304 stainless steel clamp, clamping screws and housing. Piping shall be supported at one side of joint at all joints made with coupling. Husky SD4000, MG coupling, Clamp-All 125 or equal will be acceptable.
- B. All joints for bell and spigot piping shall be made with factory molded flexible compression couplings, factory formed, integral with the bell and spigot of the pipe. Piping joints at the joining of partial sections of pipe not equipped with compressions couplings shall be made with firmly packed hemp, oakum, jute and Carey Sewertite or approved equal compound. Joints shall meet all applicable codes.
- C. Minimum size of waste piping below grade shall be (2) inches in diameter.
- D. Piping shall be supported at one side of joint and all joints made with no-hub couplings.
- E. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clear interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.
- F. Install waste piping pitched to drain at minimum slope of 1/4" per foot (2%) for piping 2 1/2" and smaller, and 1/8" per foot (1%) for piping 3" and larger.
- G. Install 1" thick extruded polystyrene over underground building drain piping not under building. Provide width to extend minimum of 12" beyond each side of pipe. Install directly over pipe, centered on pipe center line.
- H. Cleanouts: Install in sanitary above ground piping and sanitary building drain piping as indicated, as required by the International Plumbing Code; at each change in direction of piping greater than 45°, at minimum intervals of 50' for piping 3" and smaller and 80' for larger piping; and at base of each vertical waste or waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.
- I. Flashing Flanges: Install flashing flange and clamping device with each stack and cleanout passing through waterproof membrane.
- J. Vent Flashing Sleeves: Install on stacks passing through roof, secure over stack flashing in accordance with manufacturer's instructions. Coordinate installation with roofing contractor.

3.4 VENT PIPING

- A. Plumbing contractor shall provide a complete venting system for the sanitary system as shown on the contract documents, and as described herein.
- B. The vent system shall not be used for purposes other than venting of the plumbing system.
- C. Piping shall be supported at one side of joints and all joints.
- D. Minimum diameter of an individual vent above grade shall be at least one half-($\frac{1}{2}$) the diameter of the drain served, except that no vent pipe shall be less than one and one quarter (1-1/4) inches in diameter.
- E. All vent and branch vent pipes shall be sloped a minimum of one eighth ($\frac{1}{8}$) inch per foot and so connected as to drain back to the soil or waste pipe by gravity.
- F. Extension of vent pipes through a roof shall be terminated at least twelve (12) inches above the roof.
- G. Minimum size vent through the roof shall be three (3) inches in diameter. When it is found necessary to increase the size of the vent extension to meet this requirement, the change in diameter shall be made inside the building at least one foot below the roof with an approved fitting.
- H. The vents must be through the roofs before the final roofing is applied. Where necessary, the vents shall be offset in the roof construction so that they come through the roof at least 18" from walls and other objects projecting above roof surface.

3.5 DOMESTIC WATER PIPING

- A. Potable water piping shall include all domestic cold, hot and circulating piping.
- B. All copper piping shall have sweat joints, except at valves where sweat to threaded adapters shall be used. All pipes shall be reamed to full diameter before jointing. Ends of pipe and inside of fittings shall be cleaned and flux applied to entire area of pipe end to be soldered. On pipe 1-1/2 inches and larger, flux shall be applied to pipe and fittings. Solder shall be of the composition indicated below.
 - 1. 1-1/2" and larger - Silver Solder
 - 2. 1-1/4" and lower - 95-5 Solder
- C. All water piping shall be pitched approximately one (1) inch per sixty (60) feet upward from source to facilitate drainage. Where water piping must change elevation to avoid structural or other obstructions, drain valves and air vents shall be provided.
- D. Provide three quarter ($\frac{3}{4}$) inch hose end valve at all low points in system for drainage.
- E. Dielectric unions or insulated couplings shall be installed between copper or brass piping material and steel piping material. Unions or insulated couplings shall be used for pipe sizes 2" and smaller, and dielectrically gasketed flanges and sleeves for pipes 2-1/2" and larger.
- F. Provide unions on inlet and outlet of all apparatus and equipment having connections 2" and smaller. Where valves are adjacent to equipment, union shall be on the downstream side of valves. For piping over 2" flanged points shall be used.

G. Chlorination of Domestic Water Supply System:

1. After water system is completed, the entire system shall be chlorinated by injecting a strong solution of chlorine into the system of not less than 50 ppm. Valves shall be opened and closed to gain complete coverage of system. Let system stand for twenty-four (24) hours, then flush system to leave a minimum permissible concentration as recommended by the Health Department having jurisdiction. After flushing, satisfactory bacteriological results must be obtained or the mains must be re-chlorinated until satisfactory results are obtained.
2. After disinfection the water supply shall not be placed into a service until bacteriological test results of representative water samples analyzed in approved laboratory are found to be satisfactory. Certification of bacteriological testing for quality of the domestic water shall be conducted, accepted by the Project Engineer and submitted to Authorities Having Jurisdiction prior of request for final inspection.

END OF SECTION 22 05 10

SECTION 22 05 12 – PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Sleeves, Seals and Escutcheons
 - 2. Fire Resistant Foam Sealant
 - 3. Vent Flashing
 - 4. Drip Pans
 - 5. Access Doors
 - 6. Pipe Hangers, and Supports
 - 7. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 SLEEVES, SEALS AND ESCUTCHEONS

- A. Provide sleeves for each pipe passing through rated walls, partitions, floors and roofs.
- B. Sleeve Material:

Type
Designation

- 1. 1 Schedule 40 galvanized steel pipe.
- 2. 2 Duro coated cast iron body pipe with flashing clamp device integral to the pipe sleeve, similar to J.R. Smith 1720 or equal.
- 3. 3 Ductile iron pipe sleeve with center flange, flange end and plain end, length and size of the sleeve to be determined by the plumbing sub-contractor, manufactured by Clow or equal
- 4. 4 Duro coated cast iron body pipe with flashing clamp device integral to the pipe sleeve, similar to J.R. Smith 1720 or equal.

C. Sleeve Sizes:

- 1. Sleeves for uninsulated pipe provide a minimum of ½” clearance between inside of sleeve and outside of pipe.
- 2. Sleeves for insulated piping shall be adequate size to accommodate the full thickness of pipe covering with a minimum ½” clearance for packing and caulking.

D. Escutcheons:

1. Provide escutcheons on all exposed piping passing through walls, floors, partitions and ceilings.
2. Escutcheons shall be held in place by internal spring tension or set screws.

E. Application:

<u>Location</u>	<u>Escutcheon Material</u>
1. Finished spaces	Anodized aluminum chrome-plated brass
2. Unfinished spaces, excluding mechanical equipment rooms	Plain brass, cast iron or aluminum

F. Mechanical Sleeve Seals:

1. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering mechanical sleeve seals which may be incorporated in the work include, but are not limited to, the following:
 - a. Thunderline Corp.

2.2 FIRE RESISTANT FOAM SEALANT

- A. Penetrations through rated floors and walls noted elsewhere shall be sealed so as to prevent the spread of smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that after completion of the seals, the original fire rating of the floor or wall is maintained.
- B. The sealant shall remain soft and pliable to allow for the removal and/or addition of pipes or cables without the necessity of drilling holes. It shall adhere to itself perfectly to allow any and all repairs to be made with the same material.
- C. The penetration seal shall be totally contained within the thickness of the wall or floor. It shall not be necessary to build up sealant on either side of the floor or wall to achieve the necessary fire rating.
- D. The sealant shall be capable of being installed by a single tradesman, working from one side of a floor or wall.
- E. Refer to the rated wall and floor penetration details for the specific UL rated assemblies and installation guidelines.

2.3 VENT FLASHING

- A. The flashing shall be 16 oz. copper in two parts, base and cap. The base part shall consist of a sleeve to fit around the pipe at least 8" high and with flange all around extending at least 8" from the sleeve.
- B. The cap part shall be a sleeve just large enough to turn down into vent 2".
- C. Four pounds per square foot lead may be sustained for 16 oz. copper. Lead flashing shall be constructed in two parts, a base flashing and a cap.
- D. The specific vent flashing method shall be coordinated with the roofing contractor to be within the guidelines of the roof warranty.

2.4 DRIP PANS

- A. Examine the Drawings and, in cooperation with the Electrical Trade, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than two feet from a horizontal and vertical line to electric motor controllers, switchboards, panelboards or similar equipment.
- B. Where the installation of piping does not comply with the requirements of preceding paragraph, and where feasible, the piping shall be relocated or not practical as determined by the engineer. The plumbing contractor shall provide gutters as follows:
- C. Provide and erect a gutter of 18 gauge galvanized steel under every pipe which is within 2'-0" of being vertically over any motor, controllers, switchboards or the like.
- D. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.
- E. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided extending 2'-0" in all directions beyond the electrical item, over which such piping has to run.
- F. Plumbing Contractor shall provide 3/4" drain to nearest floor drain or slop sink as approved.

2.5 ACCESS DOORS IN FINISHED CONSTRUCTION

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Where devices are to be concealed in walls or above non-removable ceilings, plumbing contractor shall furnish the required access panels to the general contractor for installation.
- C. Construction of panels shall comply with the following:
 - 1. For Masonry, Tile or Wallboard Surfaces - 16 gauge steel frame, 16 gauge steel 1" wide flange, 16 gauge steel panels, concealed hinges, screwdriver operated cam lock, baked enamel prime coat. Final painting to match interior decor by GC. Panel shall be Milcor Style M.

2. For Acoustical Tile Ceilings - flangeless construction of even tile module, 16 gauge steel frame, 18 gauge recessed door panel for receiver acoustic tile by GC, continuous hinge, flush screwdriver operated cam latch, white prime coat finish; Milcor Style A7. Access panels will not be required in accessible type ceilings.
3. For Plastered Ceilings or Walls - concealed flange, recessor door panel to receive plaster by GCC, 16 gauge galvanized steel frame, 18 gauge galvanized steel panel, 3.4 gauge galvanized steel lath continuous hinges, flush latch, white prime coat finish. Final painting to match interior decor by GC; Milcor Type AP.
4. For Fire Rated Partition - Access doors in fire rate walls shall be 1-1/2 hour B rated and shall bear the UL label. Doors shall be fabricated of steel and shall be provided with a baked enamel prime coat over a phosphate coating. Doors shall be Milcor.

2.6 PIPE HANGERS, SUPPORTS AND ANCHORS

- A. All bracket, clamp and rod sizes indicated in this Specification are minimum sizes only. The installing trade shall be responsible for structural integrity of all supports. All structural hanging materials except variable spring units shall have a safety factor of 5 built in.
- B. Heavy-Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS Standards.
- C. For copper tubing, supports shall follow schedule and specifications. Supports for uncovered lines shall be especially designed for copper tubing, shall be of exact outside diameter of tubing and shall be copper plated.
- D. All hangers on piping including clevis hangers, inserts, clamps, stanchions, brackets, and rods shall be galvanized.
- E. Pipe supports shall be of the following type and figure number as manufactured by F&S or Grinnell and as hereinafter indicated.

	<u>Pipe Hanger Schedule</u>	<u>F&S</u>	<u>Grinnell</u>
1.	360 degree shield split	981	-
2.	Multi-J hood plate	92	93
3.	Clevis hanger	86	260
4.	120 degree shield	980	167
5.	Pipe saddle	900	160
		Series	
6.	U-bolt	37	137
7.	Adj. steel pipe stanchion	421	259
8.	Welded steel bracket	800	195
		or 801	or 199
9.	Single bolt riser clamp	91 or 93	261
10.	Double bolt riser clamp	92	Standard
		40	
11.	Double bolt pipe clamp	89	295
12.	Welded beam attachment W/B & N	966A	66
13.	Insert	180-A	280
		180-B	

- F. Double bolt riser clamps shall be F&S, F&M or Grinnell and shall be subject to approval.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.
- B. Prior to installation of hangers, supports, anchors and associated work, the plumbing contractor shall meet at project site with general contractor, installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect/Engineer for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified. This meeting shall be arranged by the plumbing contractor.

3.2 INSTALLATION OF BUILDING ATTACHMENTS

- A. Install building attachments at required locations, within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping, ductwork or other supported mechanical or electrical items.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Support fire protection piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- E. Provisions for Movement: Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- F. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.
- H. Insulated Piping: Comply with the following installation requirements.
- I. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
- J. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.

3.4 INSTALLATION OF DRIP PANS

- A. Each gutter shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.
- B. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided and extending 2'-0" in all directions beyond the electrical item, over which such piping has to run.

3.5 INSTALLATION OF ACCESS DOORS

- A. This work shall be performed by the general contractor.

3.6 INSTALLATION OF PIPE HANGERS AND SUPPORTS

- A. Supports, hangers, and guides shall be provided for all horizontal and vertical piping in accordance with International Building Code and NFPA.
- B. All pipe supports shall be of type and arrangement as hereinafter specified. They shall be so arranged as to prevent excessive deflection and avoid excessive bending stresses.
- C. Provide all steel and concrete required for support and anchoring of pipes other than shown on Structural or Architectural Drawings.
- D. Structural Engineer must approve method of hanging before work is started. Plumbing Contractor shall bear all responsibility for materials and workmanship as described in this section and shall make sure that all hangers and supports are properly and permanently connected to building structure.
- E. All pipe supports shall be designed to avoid interference with other piping, hangers, electrical conduits and supports, building structures and equipment.
- F. Spacing of pipe hangers shall comply with the following schedule:

	Size of Pipe	Spacing of Hangers (max. ft.)		
		Copper	Steel	Cast Iron
1.	1/2"	6	8	-
2.	3/4" to 1"	8	8	-
3.	1-1/4" to 3"	10	10	5
4.	3-1/2" & Over	10	10	5

3.7 INSTALLATION OF MECHANICAL SLEEVE SEALS

- A. Mechanical Sleeve Seals: Loosely assemble rubber links around pipe with bolts and pressure plates located under each bolt head and nut. Push into sleeve and center. Tighten bolts until links have expanded to form watertight seal.

3.8 ADJUSTMENT OF HANGERS AND SUPPORTS

- A. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.9 EQUIPMENT BASES

- A. Concrete bases shall be provided by the plumbing contractor. Prepare scaled layouts of all required bases with dimensions of bases, and location to column center lines. Furnish templates, anchor bolts, and accessories, necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings.

END OF SECTION 22 05 12

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SECTION 22 05 23 – VALVES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Gate Valves
 - 2. Check Valves
 - 3. Globe Valves
 - 4. Balancing Cocks
 - 5. Ball Valves
 - 6. Butterfly Valves
 - 7. Circuit Setters
 - 8. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 VALVES - GENERAL

- A. Furnish and install valves shown on the drawings, specified herein and/or necessary for the control and easy maintenance of all piping and equipment. All valves shall be first quality of approved manufacture, shall have proper clearances, and shall be tight at the specified test pressure. Each valve shall have the maker's name or brand, the figure or list number and the guaranteed working pressure cast on the body and cast or stamped on the bonnet, or shall be provided with other means of easy identification. All valves shall be the product of one manufacturer except for special applications. Valves shall be Nibco, Hammond, or Fairbanks. Where figure numbers of one manufacturer are stated, equivalent figure numbers can be substituted.
- B. Valves shall be of minimum working pressure and materials as fittings specified for the service except as herein modified. All gate and globe valves shall be suitable for repacking under pressure. Regardless of service, valves shall not be designed for less than 125 pounds per square inch steam working pressure.
- C. All throttling valves shall have a means of indicating valve position.

2.2 BRONZE GATE VALVES

- A. Screwed Ends, Union Bonnets, Solid Wedge:
 - 1. Bronze Gates 125 # WSP
 - a. Hammond IB631
 - b. Nibco T-135
 - c. Fairbanks U-0253

B. Solder Ends, Screwed Bonnets:

1. Bronze Gates 125# WSP
 - a. Hammond IB648
 - b. Nibco S-134
 - c. Fairbanks 0282

C. Flanged Ends:

1. Iron Gates 125# WSP
 - a. Hammond IR1140
 - b. Nibco F-617-0
 - c. Fairbanks 0405

2.3 CHECK VALVES

A. Screwed ends, Union Bonnets:

1. Bronze Spring Checks 125# WSP
 - a. Nibco T-4480
 - b. Hammond
 - c. Fairbanks

B. Solder Ends, Screwed Bonnets:

1. Stainless Steel or Bronze Spring Checks 125# WSP
 - a. Hammond DFT-GLC
 - b. Nibco
 - c. Fairbanks

C. Flanged Ends

1. Iron Checks 125# WSP
 - a. Hammond IR 1124
 - b. Nibco F-918-B
 - c. Fairbanks 0702

2.4 GLOBE VALVES

A. Screwed ends, union bonnets (composition or Teflon discs)

1. Bronze Globes 150# WSP
 - a. Hammond IB413T (2-1/2" IB420)
 - b. Nibco T-235-Y
 - c. Fairbanks U-01

B. Solder ends, screwed bonnets (Teflon discs)

1. Bronze Globes 150# WSP
 - a. Hammond IB423
 - b. Nibco S-235-Y
 - c. Fairbanks ---

C. Flanged Ends

1. Iron Globes 125# WSP
 - a. Hammond IR 116
 - b. Nibco F-718-B
 - c. Fairbanks 0131

D. Circuit Setters:

1. Circuit setters shall include brass balancing cock and taps for taking differential pressure readings. They shall be as manufactured by B&G, Taco, or Thrush.

2.5 BALL VALVES (2" AND BELOW)

- A. Nibco T-595W
- B. Jenkins 1100T
- C. Crane or approved equal

2.6 BUTTERFLY VALVES

- A. Butterfly valves shall have aluminum bronze floating type disc; Buna-N hardback type seat for temperatures up to 170 deg., EPT seat for temperatures over 170 deg., stainless steel dry journal type stems. Bodies shall be wafer or lug type with extended necks adequate for 2" insulation above companion flanges. Operators shall be on-off or infinite throttling lever type in sizes 2" and 6", and gear operators for 8" and above.
- B. The valves shall close drop-tight from 28" vac to 150 psi pressure differential.
- C. They shall be Demco, Trane, Monarch, Dover, or approved equal. Butterfly valves shall not be used in steam piping systems.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
- B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- C. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive installation.
- D. Applications Subject to Shock: Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.

- E. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- F. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.
- G. Tube Size 2" and Smaller: Soldered-joint valves.
- H. Pipe Size 2" and Smaller: One of the following, at Installer's option:
 - 1. Threaded valves
 - 2. Grooved-end valves
 - 3. Butt-welding valves
 - 4. Socket-welding valves
 - 5. Flanged valves
 - 6. Flangeless valves
 - 7. Single flanges valves
- I. Pipe size 2-1/2" and larger: One of the following, at installer's option:
 - 1. Grooved-end valves
 - 2. Butt-welding valves
 - 3. Socket-welding valves
 - 4. Flanged valves
 - 5. Wafer valves
 - 6. Single flange valves
 - 7. Hub-and-spigot valves
 - 8. Mechanical joint end valves
- J. Valve System: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- K. Non-Metallic Disc: Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- L. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.
- M. Fluid Control: Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.
- N. Ball valves may be used in lieu of gate valves for equipment shut-off in size 2" and under.
- O. Valves in positions where unauthorized closing could endanger safety or cause freezeups shall have wrench operation or lock shields and shall be marked with warning signs.
- P. Gate valves, globe valves, and strainers shall be a minimum of the pipe size marked on the drawings. Reductions where necessary because of equipment or automatic valve size shall be made with the proper eccentric reducing fittings immediately adjacent to the inlet and outlet of the automatic valve. Bypasses for automatic valves shall be full size of the valve. Provide a service valve on either side of each piece of equipment.

END OF SECTION 22 05 23

SECTION 22 05 95 – SYSTEM TESTING, CLEANING & START-UP

PART 1 - GENERAL

1.1 SCOPE

- A. This work includes cleaning the various fluid systems, pressure testing to insure tightness, and start-up of the various systems to prove their operational capability.

PART 2 - PRODUCTS

2.1 CLEANING OF SYSTEMS

- A. Clean all piping systems, equipment and accessories (especially pumps, valves, flange faces, gauges, etc.) of cutting chips and foreign matter while installing.
- B. Potable water chlorination certificate shall be provided by the plumbing contractor and made available to the State Construction Office at the time of final inspection. Certificate shall become part of closeout documents.

2.2 GENERAL

- A. Be careful to provide all sight glasses, control valve, pumps and any items that could be damaged by foreign material with 40 mesh screen on the inlet side or bypass, or remove such items.
- B. Clean out all low velocity areas where dirt accumulated.
- C. Protect all water systems from freezing.
- D. Clean all strainers and dirt legs.

2.3 START-UP AND TEST

- A. Each system shall be started-up and a preliminary test made as follows:
- B. This contractor shall make trial runs of each piece of equipment furnished by him. This contractor shall provide all oil, grease and other lubricants for the operation of all equipment until acceptance. This contractor shall be held responsible for all damage to bearing while the equipment is being operated by him up to date of acceptance of the equipment, and for a period thereafter as per the general building warranty. The subcontractor shall be required to protect all bearings during installation and shall thoroughly grease steel shafts to prevent corrosion.
- C. The contractor shall align each shaft and adjust all pulleys to run substantially vibration free. Where equipment cannot be so adjusted by the contractor, the manufacturer shall provide a machinist or serviceman to make these adjustments. Vibration free is construed to mean that rotating machinery shall not exceed a self-excited vibration velocity of 0.10 inches per second in any direction when measured with a vibration meter on the bearing caps of the machine.

- D. Belts shall be checked for alignment and tightened to proper tension.
- E. Overload elements in motor starts shall be checked and proper elements provided as required for the motor full load amp rating.
- F. Glands, seals, etc. shall be examined and properly adjusted.
- G. Air vents shall be bled.
- H. Equipment shall be started per manufacturer's instructions and run in.
- I. Read amperage and voltage on each motor the first time it is started and check direction of rotation.
- J. Run an operating test on each piece of equipment. The tests shall be sufficient to show that the equipment has been run and observed and shall include the following:
 - 1. Volts and amps on each motor.
 - 2. Results of preliminary tests shall be submitted before test and balance subcontractor commences his work.

END OF SECTION 22 05 95

SECTION 22 07 00 – INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide insulation as specified for: Piping systems including valves, couplings, fittings, flanges, strainers, and expansion joints.
 - 1. Equipment, including tanks, and components subject to heat loss or heat gain.
 - 2. Other items where shown on drawings and/or specified.

1.2 SUBMITTALS

- A. Shop drawings shall be submitted on all items in accordance with the provisions of specification Section 22 01 00.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. In addition to this Section, this sub-contractor shall refer to other specification sections and drawings to ascertain the extent of work, including: All Division 22 Sections.

1.4 DEFINITION

- A. Work under this Division 22 of the specifications shall include but not necessarily be limited to items common to Sections:
 - 1. 22 07 02 Potable Cold Water Piping Insulation
 - 2. 22 07 04 Potable Hot Water Piping Insulation

1.5 QUALITY ASSURANCE

- A. Provide piping insulation products produced by one of the following manufacturers for each type and temperature range of insulation.
 - 1. Certainteed Corporation
 - 2. Owens-Corning Fiberglass Corporation
 - 3. Knauff Corporation
 - 4. Armstrong Cork Company

1.6 SUBMITTALS

- A. Shop drawings shall be submitted on all items in accordance with the provisions of specification Section 22 01 00.

B. Submit shop drawings on the following:

1. Insulation
2. Fitting covers

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged insulation; remove from project site.
- B. Delivery insulation, covering, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp, or label, affixed showing fire hazard ratings of the products.
- C. Store insulation in original wrappings and protect from weather and construction traffic.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS - PIPING INSULATION

- A. Insulation shall have composite (insulation jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E84, NEPA 255 or UL 723 not exceeding:
 1. Flame Spread-25
 2. Smoke Developed 50
- B. Accessories such as adhesives, mastics, cements, tapes and cloth for fittings shall have the same component rating as listed above. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of water-soluble treatments is prohibited.
- C. Where Benjamin-Foster adhesives are specified equal products manufactured by 3M Company, or the manufacturer of the insulation are acceptable upon approval by the Engineer. Armstrong 520 adhesive shall be used for Armstrong insulation.
- D. In lieu of the insulation wrap specified for fittings, valves, mechanical couplings and flanges, unitary type insulation products similar to J-M Unifit shall be acceptable.
- E. Underground piping shall be directed buried pre-insulated piping.

PART 3 - EXECUTION

3.1 GENERAL EXECUTION REQUIREMENTS - PIPING

- A. Insulation shall be applied on clean dry surfaces, after inspection and release for insulation application. Items that are factory insulated shall not receive additional insulation.

- B. Insulation shall be continuous through non-rated wall and ceiling openings and sleeves.
- C. Insulation on cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal. Anchors, etc., that are secured directly to cold services shall be adequately insulated and vapor sealed to prevent condensation.
- D. Where insulation is specified for piping, insulate similarly all connections, vents, drains, and any appurtenances and piping connected to system subject to heat loss or gain. Unions, couplings, or flanges provided at equipment for removal of heat exchanger, etc., shall be insulated with removable molded blocks.
- E. Where inserts occur at pipe supports and guides, provide the following:
 - 1. On hot pipe apply 3" wide vapor barrier tape or band over the butt joints.
 - 2. On cold pipe apply a wet coat of vapor barrier lap cement on all butt joints and seal all joints with 3" wide vapor barrier tape or band.
- F. Fittings, valves, mechanical couplings and flanges shall be insulated with the same material and of the same thickness as the adjoining piping, except where otherwise specified.
- G. Concealed piping insulate with glass fiber insulation types shall be banded in place with three aluminum bands per section, one over each end of the joint sealing strip, and one in the middle of the section.
- H. All exposed piping shall be finished with an 8 ounce canvas jacket posted to the insulation and if within 8'-0" of the floor shall be finished with an additional aluminum jacket (.016" preformed). Exposed fittings, etc. shall be finished with fitting cloth smoothly adhered and coated with Benjamin-Foster 30-36. Lap the cloth on itself and adjoining pipe insulation. Lap to be at least 1" on pipe insulation below 4" and 2" on sizes 4" and above.
- I. On pipe sizes 4" and larger, fittings, mechanical couplings, and valves shall be insulated with molded fitting covers. Flanges shall be insulated with sectional pipe insulation extending a minimum of 1" beyond the end of the bolts. Bolt area shall be fitted with insulating and finishing cement.
- J. All piping subject to freezing such as in outdoor air or discharge plenums or outdoors shall be insulated with twice the insulation thickness specified.

3.2 GENERAL EXECUTION REQUIREMENTS - EQUIPMENT

- A. Insulation shall be firmly held in place with galvanized steel wire or galvanized steel bands on 12" centers.

3.3 PROTECTION AND REPLACEMENT

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation installer shall advise plumbing contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

END OF SECTION 22 07 00

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SECTION 22 07 02 - POTABLE COLD WATER PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide insulation as specified for cold water piping systems, including valves, mechanical coupling, fittings, flanges and strainers.
 - 1. Other items where shown on drawings or as specified.

PART 2 - PRODUCTS

2.1 PIPING INSULATION TYPES

- A. Type P-1 Pipe Insulation:
 - 1. Insulation shall be glass fiber with a maximum K factor of .24 at 75°F mean temperature with factory applied fire resistant vapor barrier jacket.
 - 2. For fittings and valve bodies 3" and smaller, insulation shall be one-pound density glass fiber blanket wrapped firmly under compression with No. 20 gauge galvanized annealed steel wire and given a smoothing coat of finishing cement.

B. Insulation Thickness Schedule:

<u>Piping System</u>	<u>Thickness</u>
1. Potable Cold Water	1" Min.
2. Roof Drainage	1" Min.

- C. Type P-2 Pipe Insulation:
 - 1. Insulation shall be the same as Type 1 except fittings and valves 3" and smaller shall be insulated and finished with insulation and finishing cement to a thickness equal to the adjoining pipe insulation.

D. Drainage Piping Within A Ceiling Cavity From Ice Machines:

- 1. Insulate the drain body, p-trap and the first 10'-0" of piping.

PART 3 - EXECUTION

3.1 PIPING INSULATION

- A. Type P-1 Insulation:
 - 1. Longitudinal lap and 4" wide vapor barrier joint seal strips shall be adhered neatly in place with BF 85-20 adhesive or approved equal.

2. The ends of pipe insulation shall be sealed off with BF 30-35 coatings at all open ends, flanges, valves and fittings and at intervals of not more than 21 feet on continuous runs of pipe.
3. Fittings shall be vapor sealed by applying a layer of white open weave glass fabric (20 x 20) between two 1/16" thick coats of BF 30-35.

B. Type P-2 Insulation:

1. Type P-2 insulation shall be installed as P-1 above exception that insulation end not be vapor sealed.

END OF SECTION 22 07 02

SECTION 22 07 04 - POTABLE HOT WATER PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide insulation as specified for hot water piping systems, including valves, mechanical coupling, fittings, flanges and strainers.
- B. Equipment and components subject to heat transfer including:
 - 1. Other items where shown on drawings or as specified.

PART 2 - PRODUCTS

2.1 PIPING INSULATION TYPES

- A. Type P-3 Pipe Insulation:
 - 1. Insulation shall be molded glass fiber with a maximum K factor of 0.24 at 75°F mean temperature with factory applied Fire Retardant Jacket.
 - 2. For fittings and valves bodies 3" and smaller, insulation shall be one-pound density glass fiber blanket wrapped firmly under compression with No. 20 gauge galvanized annealed steel wire and given a smoothing coat of finishing cement.
- B. Insulation Thickness Schedule:

	<u>Piping System</u>	<u>Pipe Size</u>	<u>Thickness</u>
1.	Potable Hot Water Supply and Tempered Water	0 - 2½"	1"
2.	Recirculating Return (100°F to 290°F), Tempered Water Return	3" & larger	1½"

2.2 EQUIPMENT INSULATION TYPES

- A. Type E-2 Equipment Insulation:
 - 1. Insulation shall be 6# per cubic foot density glass fiber with fire retardant vapor barrier facing and having a maximum K factor of 0.24 at 75°F mean temperature.
 - 2. Sections of equipment requiring periodic servicing shall be insulated with removable ArmourCote covers as manufactured by Insulcoustic Corp. or by Sheet Metal Casing with insulation applied to the interior surface of the casing.

END OF SECTION 22 07 04

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SECTION 22 21 13 - HYDRONIC WATER SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work shall consist of furnishing all labor, material equipment and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Escutcheons
 - 2. Unions
 - 3. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. Chrome plate, stamped steel, hinged, split-ring escutcheon, with set screws. Inside diameter shall closely fit pipe outside diameter, or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings.

2.2 UNIONS

- A. Unions shall be of malleable iron, ground joint type for steel pipe, or brass for copper tubing, installed at all tanks, etc. Where piping system is composed of dissimilar metals, copper and steel, etc., furnish and install insulating unions, dielectric type Epco FX and GX or Water Gallatt insulating couplings. For mains install on dielectric union at building entrance.

PART 3 - EXECUTION

(Not Used)

END OF SECTION 22 21 13

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SECTION 22 40 00 - PLUMBING FIXTURES AND TRIM

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.

1.2 SHOP DRAWINGS:

- A. Shop drawings shall be submitted on all equipment including the following:
 - 1. Fixtures
 - 2. Cleanouts
 - 3. Trim
 - 4. Floor Drains
 - 5. Flush Valves
 - 6. Hose Bibs
 - 7. Seats
 - 8. Wall Hydrants
 - 9. Carriers
 - 10. Back flow preventers
 - 11. Other items where shown on the drawings or as specified.
- B. All fixtures equipment and trim shall be made by company with not less than 5 years successful service in this country and in similar installments.

1.3 FIXTURES:

- A. All vitreous china fixtures shall be 2 fired, conforming in all respects to the standards adopted by the Vitreous China Fixtures Manufacturers Advisory Committee.
- B. Unless otherwise specified all vitreous china fixtures shall be white.

1.4 HANGING:

- A. Fixtures designed for wall mounting shall be provided with supports complete with all couplings, gaskets, anchors, etc. for compatible installation with fixtures provided.
- B. Wax gaskets shall not be used on fixtures receiving hot water.

1.5 PIPING AND TRIM:

- A. All exposed piping and trim, traps, valves, tail-pieces, faucets and fittings shall be chrome finished and shall be made of copper or copper alloy. P-traps shall be made of chrome-plated cast brass.

PART 2 - PRODUCTS

2.1 FIXTURES SCHEDULE:

- A. The following list and description of fixtures are from Kohler. Similar fixtures as manufactured by American Standard or Crane will be acceptable for approval. Stainless steel fixtures shall be 18-gauge type 302 nickel-stainless steel by Elkay. Similar fixtures by American Standard or just will be acceptable for approval. Note: PC to supply template to counter manufacturer for proper hole cutting.
- B. Seats shall be as manufactured by Olsonite. Similar seats by Beneke, Bemis, or Church will be acceptable for approval. All seats shall have open front, concealed check stops and self-sustaining features.
- C. Faucets and trim shall be as manufactured by Kohler. All screws and index buttons shall be vandal-proof. Similar faucets and trim by Delta or Chicago Faucet Co. will be acceptable for approval.

2.2 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering plumbing fixtures and trim which may be incorporated in the work include, but are not limited to, the following:
- B. Plumbing Fixtures:
 - 1. American Standard
 - 2. Crane Co.
 - 3. Eljer Plumbingware
 - 4. Kohler Co.
- C. Plumbing Trim:
 - 1. American Standard
 - 2. Chicago Faucet Co.
 - 3. Eljer Plumbingware Div
 - 4. Kohler Co.
 - 5. Speakman Co.
 - 6. T & S Brass and Bronze Works, Inc.
- D. Flush Valves:
 - 1. Sloan Royal

E. Fixture Seats:

1. Bemis Mfg. Co.
2. Beneke Corp.
3. Olsonite Seats

F. Water Coolers:

1. Ebco Mfg. Co.
2. Elkay Mfg. Co.
3. Halsey Taylor Div
4. Haws Drinking Faucet Co.
5. Sunroc Drinking Fountains

G. Service Sinks:

1. American Standard
2. Crane Co.
3. Eljer Plumbingware
4. Fiat Products
5. Stern-Williams Co., Inc.

H. Stainless Steel Sinks:

1. Elkay Mfg. Co.
2. Just Mfg. Co.
3. Moen, Div. of Stanadyne/Western

I. Fixture Carriers:

1. Josam Mfg. Co.
2. Kohler Co.
3. Tyler Pipe
4. Zurn Industries
5. Wade

2.3 FIXTURES TYPES

A. S-1 Countertop Sink: (Handicap)

- Type: Double compartment, 33"x22"x6.5" deep, 2-hole, 18 ga., type 304 stainless steel, self-rimming, screwed clip mounting, 4" centers.
- Mfg: Elkay No. LRAD332265PD – "Lusterstone"
- Faucet: 4" centers, 4" rigid gooseneck spout, polished chrome, 4" wristblade handles, laminar aerator
- Mfg: Elkay Model LK406GN04T4
- Drain: Grid strainer
- Trap: 1-1/2" tubular adjustable p-trap, 17 ga, polished chrome
- Supplies: Polished chrome 1/2" x 3/8" loose key angle stops with 3/8" o.d. flex risers.
- Note: Furnish Handi-Lav-Guard Kit No.102, p-trap insulation, cold and hot water angle stop insulation and fasteners

B. RB-1 Refrigerator Ice Maker Box:

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

Type: 1/2" inlet with non-removable vacuum breaker, 1/4" turn brass ball valve
wall mounted, white plastic construction. Sweat connection.

Mfg: IPS Corporation Product Code 87967 "Water-Tite"

END OF SECTION 22 40 00

SECTION 22 90 00 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS - BUILDING

- A. Submit as-built drawings as required by General Conditions and obtain written receipt from engineer.

1.2 DEMONSTRATION OF COMPLETE PLUMBING SYSTEMS

- A. The following systems shall be put into operation by the plumbing sub-contractor furnishing the equipment, and operated for the length of time required to prove proper operation and control.
 - 1. Cold water
 - 2. Hot water systems/recirculation systems
 - 3. Waste
- B. Thoroughly demonstrate and instruct (3) three designated representatives of the Owner in the care and operation of all the plumbing systems and equipment furnished and installed in the contract.
- C. Manufacturers of certain equipment specified herein shall provide technically qualified factory representatives to train the Owner's representative in the care and maintenance and operation of their product. This instruction and service of the factory representative shall be furnished as specified elsewhere in the specifications. This time is in addition to what is specified above and will not be counted as part of this contractor's instructions.
- D. The time and place of all training shall be coordinated and scheduled by the contractor at the convenience of the Owner and as approved by the architect.
- E. Submit letters signed by the owner's representatives attesting to the satisfactory completion of all instructions.

1.3 OWNER'S RIGHT TO TEST SYSTEM

- A. Should, in the opinion of the architect, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this contract, the right is reserved for the owner and architect to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the owner. If the tests indicate a deficiency in equipment capacity or performance, the contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the owner and the architect.

1.4 OPERATING AND MAINTENANCE MANUALS

- A. The contractor shall carefully prepare an operating instructions and maintenance manual for each plumbing system, including all equipment furnished. The manual shall be submitted to the engineer for approval before final inspection and acceptance is made.

- B. The form in which the operating maintenance manual is to be presented shall be subject to approval by the architect. Three copies of the manual shall be provided.
- C. The following items together with any other necessary and pertinent data shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
 - 1. Suggested settings of all control and switches for normal operation with description of control and its location.
 - 2. A check list for periodic maintenance of all equipment.
 - 3. As-built wiring, interlock, and control diagrams for the equipment, with color coding shown on wiring and interlock diagrams.
 - 4. Part numbers of all replaceable items.
 - 5. Manufacturer's cuts and rating tables for all equipment.
 - 6. Oiling, lubricating and greasing data.
 - 7. Complete electrical load data from operation tests.
 - 8. Test data on all equipment
 - 9. Belt sizes, types, and lengths
 - 10. Serial number of all principal pieces of equipment
 - 11. Valve tag schedule
 - 12. Manufacturers', suppliers' and contractors' names, addresses and telephone numbers.

1.5 VALVE TAG SCHEDULE

- A. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the equipment room.

1.6 WARRANTIES

- A. Deliver to Owner all warranties, etc., and obtain written receipts.

1.7 OBSERVATION REPORTS

- A. During construction period the engineer will issue observation reports. These items shall be completed before engineer will approve next application for payment. Final punch list work shall be complete before acceptance.

1.8 FINAL INSPECTION AND ACCEPTANCE

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
- B. Submit a list of uncompleted items, if any, and advise when the items will be done.
- C. Clean, test, and adjust all systems and equipment.
- D. Lubricate all motors.
- E. Complete all items on architect's or engineer's pre-final punch list.
- F. Final inspection and tests of the completed construction shall be performed in the presence of the architect or his representative and shall be at such times as are convenient to the architect.

Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for these tests shall be furnished by the contractor at his own expense.

- G. Final Clean-up. During construction the contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises to remove all evidence of his work. In addition, upon completion of construction he shall clean, wash, and/or polish all fixtures, equipment, and exposed material and leave them bright and clean.

END OF SECTION 22 90 00

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SECTION 23 00 10 - GENERAL PROVISIONS – MECHANICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. The work to be done under Division 23 contracts shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all work as shown on the plans and herein specified, excepting only work materials specified or noted as being furnished or installed by others.
- B. All work shown in the drawings and specifications shall be included under the base bid, except where there is specific reference to exclusion and incorporation in other quotation.
- C. The HVAC contractor for this single prime contract may hereinafter also be referred to as "This Contractor, "MC", or Division 23 Contractor.
- D. Division of the Specification into sections is for the purpose of simplification alone. Responsibility for the work of various trades shall rest with the Contractor. Various sections of this Division are related to each other as well as the mechanical drawings. Examine all drawings and read all applicable parts of the project manual in order to insure complete execution of all work in this Division, coordinating where required with other trades in order to avoid conflicts.
- E. These specifications and accompanying drawings are intended to cover the furnishing of all labor, materials, equipment and services necessary for the complete installation and acceptable performance of the mechanical systems. Small items of material, equipment and appurtenances not mentioned in detail or shown on the drawings, but necessary for complete and operating systems, shall be provided by this contractor without additional charge to the Owner and shall be included under this contract.
- F. In general, specifications establish the quality of material, equipment and workmanship. The contract documents are intended to secure for the Owner, a first class installation in every respect. Labor shall be ready for satisfactory and efficient operation.
- G. The contractor shall carefully examine the drawings and specifications before accepting the contract. He shall call attention to any changes or additions which, in his opinion, are necessary to make possible the fulfillment of any guarantee called for by these specifications; failing which, it shall be deemed that he has accepted full responsibility for all such guarantees.
- H. The contractor shall put his work in place as fast as is reasonably possible. He shall, at all times, keep a competent foreman in charge of the work, to make decisions necessary for the diligent advancement of the work. The Contractor shall facilitate the inspection of the work by the Owner's Representative.
- I. The Contractor shall coordinate all HVAC related work in the building in order to facilitate intelligent execution of the work. He shall also remove any rubbish as expeditiously as possible.

- J. Materials or products specified herein and/or indicated on the drawings by trade names, manufacturer's names or catalog numbers establish the quality of materials or products to be furnished.
- K. Points of connection or continuation of work under this contract are so marked on drawings or herein specified. In case of any doubt as to the required exact location of such points, the Owner's Representative shall decide and direct.

1.2 SPECIALTY SCOPE OF WORK

- A. The mechanical contractor shall include in the base bid and alternate bids all costs and time for himself, his control subcontractor, and his test and balance subcontractor to accomplish the following:
 - 1. Shop Drawing Efforts:
 - a. Equipment shop drawings shall include service space requirements, manufacturer's equipment installation brochure and all noise and vibration information.
 - b. The shop drawings shall include a cover sheet stating in detail, exceptions to the projected specifications and plans. If not included for A/E comment, any unlisted exceptions shall be paid for by the contractor.
 - c. In addition to the shop drawing requirement listed in the individual specification sections, all shop drawings shall be submitted, complete with the manufacturer's published installation guidelines.
 - 2. Duct Leakage and Fan Performance
 - a. The allowable leakage shall meet the current edition of the SMACNA HVAC Air Duct Leakage Test Manual. The fan air flow shall not be less than the scheduled air flow quantity. Does not apply to low pressure ductwork systems such as exhaust air return, outdoor air, and general exhaust air.
 - 3. Engineer's Response to RFI's:
 - a. Due to the technical and aesthetic nature of this project, the mechanical contractor shall be pro-active in his understanding of work efforts to allow the engineer 10 working days to respond to RFI's without consideration of time delay to the project schedule.

1.3 WORK INCLUDED:

- A. The HVAC Contractor shall be responsible for including all labor, accessories, tools, equipment and material required to completely execute installation of the entire heating, ventilating and air conditioning system as shown on the drawings and as specified. Work under the Mechanical contract shall include but not be limited to the furnishing, unloading, handling distribution, setting and installation of all components required for the following systems:
 - 1. Air Conditioning System
 - 2. Heating System
 - 3. Ventilation System

4. Air Distribution System
5. Insulation
6. Temperature Control
7. Testing and Balancing
8. Hot Water Systems
9. Other Work as Herein Specified

1.4 RELATED WORK WHICH IS A PART OF SECTION 23 00 10:

- A. All work done under this section of the specification is subject to the Architect's instructions to bidders, general conditions and their corresponding supplements.
- B. Refer to the supplementary general conditions of these specifications for temporary services and facilities that shall be provided.

1.5 DEFINITIONS:

- A. "Piping": Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents, and items customarily required in connection with the transfer of fluids.
- B. "Ductwork": All air delivery, recirculation and exhaust ducts, whether of sheet metal or other material, and includes all connections, accessories, and appurtenances necessary for and incidental to a complete system.
- C. "Provide" (P): Furnish and install complete ready for use.
- D. "Furnish" (F): Purchase and deliver to the project site complete with every necessary appurtenance and support.
- E. "Install"(I): Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation of the proper location in the project.
- F. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double partitions of hung ceilings, in crawl spaces, in shafts.
- G. "Finished Spaces": Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.
- H. "Chilled Water Piping": For the purposes of these plans and specifications the requirements of "chilled water piping" shall also apply equally to "process chilled water piping system" and "chilled beam piping systems".
- I. "Exposed, Interior Installations": Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- J. "Exposed, Exterior Installations:" Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- K. "Concealed, Interior Installations": Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in-duct shafts.

- L. "Concealed, Exterior Installations": Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- M. "By Other Trades": Shall mean by persons or parties who are not anticipated to be the HVAC Contractor working together with the general contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall contract.

1.6 ABBREVIATIONS:

1.	AD	Automatic Damper/Access Door
2.	AFF	Above Finish Floor
3.	AMP	Amperes
4.	AP	Access Panel
5.	AV	Air Vent
6.	BO	By Others
7.	BOW	Baked On White
8.	CC	Cooling Coil
9.	CD	Ceiling Diffuser or Condensate Drain
10.	CL	Ceiling
11.	CO	Clean Out
12.	CONTR	Contractor
13.	CP	Circulating Pump
14.	CR	Condenser Water Return
15.	CS	Condenser Water Supply
16.	DB	Decibels
17.	DN	Down
18.	EA	Exhaust Air
19.	EF	Exhaust Fan
20.	EG	Exhaust Grille
21.	ELEC	Electrical
22.	E/S	Emergency Stop Switch
23.	F	Furnish or Filter
24.	FD	Floor Drain/Fire Damper
25.	FL	Floor
26.	G	Grille
27.	HC	Heating Coil
28.	HP	Heat Pump Unit
29.	HX	Heat Exchanger
30.	I	Install
31.	M	Motorized Damper
32.	NC	Noise Criteria
33.	NLL	Night Low Limit Switch
34.	OBD	Opposed Blade Damper
35.	P	Provided (Furnished & Installed)
36.	PH	Phase
37.	PLBG	Plumbing
38.	PRV	Pressure Reducing Valve
39.	RA	Return Air
40.	RF	Return Fan
41.	RG	Return Grille
42.	SA	Supply Air
43.	SD	Strip Diffuser or Smoke Detector

44.	FD/SD	Smoke/Fire Dampers
45.	SF	Supply Fan
46.	SP	Static Pressure
47.	SS	Stainless Steel
48.	T	Transfer/Thermostat
49.	UH	Unit Heater
50.	VAV	Variable Air Volume Box
51.	Ø or PH	Current Phase

1.7 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to a specific element of work, take precedence over the specifications where they may conflict.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.
- D. The drawings of necessity utilize symbols as schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specification only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

- C. Coordinate installation of required supporting devices and set sleeves in poured-in place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors".
- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

1.9 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc., material, equipment and apparatus provided under this Division, both in storage and installed, until Notice of Completion has been filed.
- B. Provide temporary storage facilities for materials and equipment.
- C. Material, equipment or apparatus damaged because of improper storage or protection will be rejected.
 - 1. Remove from site and provide new, duplicate, material, equipment or apparatus in replacement of that rejected.
- D. Cover motors and other moving machinery to protection from dirt and water during construction. Rotate moving equipment, shafts, bearings, motors, etc. to prevent corrosion and to circulate lubricants.
- E. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.
 - 1. Contractors shall be responsible for the replacement of all damaged or defective work, materials or equipment. Do not install sensitive or delicate equipment until major construction work is completed.
 - 2. Remove replaced parts from premises.
- F. Make good any damage to the work caused by floods, storms, accidents, acts of God, acts of negligence, strokes, violence or theft up to time of final acceptance by owner.
- G. Do not leave any mechanical work in a hazardous condition, even temporarily.

1.10 REVIEW OF CONSTRUCTION

- A. Work may be reviewed at any time by representative of the Engineer.
- B. Advise Architect and Engineer that work is ready for review at the following times:
 - 1. Prior to concealment of work in walls and above ceilings.
 - 2. When all requirements of Contract have been completed
- C. Neither backfill nor conceal work without Engineer's consent.
- D. Maintain on job set of Specifications and Drawings for use by Engineer's representatives.

1.11 DELINEATION OF WORK:

- A. The HVAC contractor is required to supply all necessary supervision and coordination of information to any others who are performing work to accommodate HVAC installation. Where the mechanical contractor is required to install items which he does not purchase, he shall include for such items:
 - 1. The coordination of their delivery.
 - 2. Their unloading from delivery trucks driven in to any designated point on the property line.
 - 3. Their safe handling and field storage up to the time of permanent placement in the project.
 - 4. The correction of any damage, defacement or corrosion to which they may have been subjected.
 - 5. Their field assembly and internal connections as may be necessary for their proper operation.
 - 6. Their mounting in place including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions.
 - 7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.
- B. Items which are to be installed but not purchased as part of the work of the HVAC contractor shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The work under this contract shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.
- C. The specifications for the overall construction delineate various items of work under separate section headings. The list below set forth this delineation to the extent that it affects the HVAC work category. In the absence of more detailed information, this list shall be taken as a specific instruction to the HVAC contractor to include the work assigned to him. Indications that each contractor is to perform the work means that it is to perform the work for its own accommodation only, except as specifically noted otherwise.

"P" indicates Provide
"F" indicates Furnish
"I" indicates Install

Item	"General"	"Plbg"	"HVAC"	"Elect"
Motors for mechanical equipment			P	
Motor controls for Mechanical equipment	Refer to motor control schedules			
Power wiring for mechanical equipment, as qualified in Sections 23 01 50 and 23 01 51			P	P
Hoisting			P	
Rigging			P	
Cutting and Patching			P	
EXCEPTION: Cost where due to late installation or improper coordination of work is the responsibility of the delinquent contractor. Locations shall be approved by structural engineer.				
Framed slots and openings in walls, decks and slabs			P	
EXCEPTION: Coordination drawings are required from HVAC contractor.				
Sleeves through non-membraned slabs, decks and walls			P	
EXCEPTION: Refer to Division 1 for coordination of installation.				
Sleeves through membraned slabs, decks and walls			P	
EXCEPTION: Refer to Division 01 for coordination of installation.				
Fireproof sealing of Excess opening in Slabs, Decks & Fire Rated Walls			P	
Excavation and backfill of trenches inside building			P	
EXCEPTION: Drawings delineate exceptions.				
Fastenings			P	
Supports			P	

Item	"General"	"Plbg"	"HVAC"	"Elect"
Finished wall and ceiling access doors, panels and support frames	I		F	
<u>EXCEPTION:</u> HVAC contractor shall furnish and locate all required access doors to the installing trade.				
Removal of spray on fire from mechanical equipment, ductwork, piping, hangers, etc.	P			
Rubbish Removal			P	
<u>EXCEPTION:</u> Where one trade furnishes and another installs, the installing trade shall remove the shipping and packing material which accumulate.				
Special tools for equipment maintenance			P	
Piping and Associated Work Outside of the Building Line			P	
Laboratory Related Equipment			P	
<u>EXCEPTION:</u> Rough-in and final connection shall be provided by the HVAC contractor providing specified services.				

- D. This HVAC contractor is required to supply all necessary supervision and coordination of information to any others who are supplying work to accommodate his installation.

1.12 STANDARDS AND CODES:

- A. Nothing in this specification shall be interpreted to conflict with any State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction."
- C. All equipment with electrical components shall bear the UL label.
- D. The following minimum standards apply wherever applicable:
 1. ANS American National Standards
 2. ASME American Society of Mechanical Engineers
 3. ASTM American Society for Testing Materials
 4. NEMA National Electrical Manufacturers Association

5. NFPA National Fire Protection Association
6. OSHA Occupational Safety and Health Act
7. SMACNA Sheet Metal and Air Conditioning Contractors National Assoc., Incorporated
8. AGA American Gas Association
9. ASA American Standards Association
10. NBFU National Board of Fire Underwriters
11. ASHRAE American Society of Heating, Refrigerating and Air Conditioning, Engineers, Inc.

1.13 JOB CONDITIONS

- A. This contractor shall investigate all conditions affecting his work and shall provide such offsets, fittings, valves, sheet metal work, etc. as may be required to meet conditions at the building.
- B. The contractor shall verify all measurements at the building site and shall be responsible for the correctness of it before ordering materials or before starting work of any section.
 1. Report to Architect, in writing, conditions which will prevent proper provisions of this work.
 2. Beginning work of any section without reporting unsuitable conditions to Architect constitutes acceptance of conditions by Contractor.
 3. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to Owner.
- C. Piping and ductwork shall be concealed or run behind furring in finished spaces unless otherwise noted to be run exposed.
- D. Horizontal piping and ductwork not run below slabs on grade shall be run as close as possible to underside of roof or floor slab above and parallel to building lines. Maintain maximum headroom in all areas.
- E. Determine possible interference between trades before the work is fabricated or installed. The contractor must coordinate his work to insure that erection will proceed without such interference. Coordination is of paramount importance and no request for additional payment will be considered where such request is based upon interference between trades.
- F. Connection to Existing Work:
 1. Install new work and connect to existing work with minimum of interference to existing facilities.
 2. Temporary shutdowns of existing services;
 - a. At no additional charges
 - b. At times not to interfere with normal operation of existing facilities
 - c. Only with written consent of Owner
 3. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 4. Restore existing disturbed work to original condition.
- G. Piping or ductwork:
 1. Prohibited, except as noted, in:
 - a. Electric rooms and closets

- b. Telephone rooms and closets
 - c. Elevator machine rooms
 - d. Electric switchboard room
2. Prohibited, except as noted, over or within 5 feet of:
- a. Transformers
 - b. Substations
 - c. Switchboards
 - d. Motor control centers
 - e. Standby power plant
 - f. Bus ducts
 - g. Electrical panels
3. Provide drip pans under piping:
- a. Only where unavoidable and approved
 - b. 18 gauge galvanized steel – with bituminous paint coating
 - c. Reinforced and supported
 - d. Watertight
 - e. With 1 ¼ inch drain outlet piped to floor drain or service sink

1.14 SPECIAL TOOLS

A. Furnish to Owner at completion of work

- 1. One set of any special tools required to operate, adjust, dismantle or repair equipment furnished under any section of the Division
- 2. "Special tools": Those not normally found in possession of mechanics or maintenance personnel
- 3. One pressure grease gun for each type of grease required with adapters to fit all lubricating fittings on equipment. Include lubricant for lubricating plug valves.

1.15 INSPECTION AND COOPERATION:

- A. All work shall be done under the periodic observation of and to the complete satisfaction of the Architect. No deviations from the Drawings and Specifications will be allowed without prior written approval of the Architect. The HVAC contractor shall each cooperate with the other contractors to allow for the installation of their work as well as his own.
- B. The HVAC contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this contractor without regard for other work, or if a conflict results, must be changed if directed by the Architect or Engineer without additional cost to Owner or his agents.
- C. Relocation of equipment, system connections or rough-in locations up to ten feet (10'), if necessary, shall be done at no additional cost to the Owner or his agents.
- D. All concealed work shall be inspected by the Architect or his appointed representative before being concealed. HVAC contractor shall call for inspection at least two (2) work days before concealment.

- E. The Architect shall have the right to inspect the work whenever advisable in his judgment. The HVAC contractor shall have a representative present at each inspection and shall give such assistance as may be required.
- F. Recommendations made by the Architect shall be promptly carried out and all unsatisfactory material and workmanship replaced at once to the Architect's satisfaction at the HVAC contractor's expense.
- G. HVAC contractor shall be responsible for hoisting of all materials and equipment furnished under as part of his portion of the work in accordance with all State and Federal rules and regulations.

1.16 TEMPORARY SERVICES AND FACILITIES:

- A. Refer to general requirements for temporary services and facilities that shall be provided.

1.17 UNIT PRICES:

- A. Refer to general requirements relative to "Add" or "Deduct" prices relative to this contract.

1.18 SUBMITTALS:

A. SHOP DRAWINGS:

- 1. A complete list of shop drawings to be submitted by the Division 23 contractor will be provided with the pre-construction conference minutes of meeting.
- 2. Prior to purchasing any equipment or materials, the approved list of the manufacturers shall be returned by the Engineer to the HVAC contractor.
- 3. Shop drawings shall be submitted conforming to the requirements stated in supplementary conditions and Division 01 for the items indicated throughout the following specifications:
 - a. Documents will not be accepted for approval unless:
 - 1) They comply with the requirements of the supplement to the General Conditions.
 - 2) They include complete information pertaining to appurtenances and accessories.
 - 3) They are submitted as a package where they pertain to related items.
 - 4) They are properly marked with service or function identification as related to the project, where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 - 5) They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
 - 6) The submittal is stamped approved by the HVAC contractor and contain no other markings.

- b. Approval of shop drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

B. AS-BUILT DRAWINGS:

1. The HVAC contractor shall provide one set of marked plans to the Engineer for his preparation of as-built drawings. The marked plans shall indicate correct location of all equipment, piping, etc. as installed on project.
2. The drawings shall provide an accurate and complete record of the work as installed, and shall be presented at each monthly meeting for review by the architect.

C. RECORD DRAWINGS:

1. Purchase and maintain at the job site a complete and separate black line set of prints of the approved working Drawings on which to accurately indicate daily progress by coloring materials and apparatus as installed. Schedules shall be modified to reflect data consistent with that of the installed equipment. Clearly show all changes to work as a result of change orders, instruction issued by the Architect or conditions encountered in the field. Accurately indicate the locations, size, type and elevation of new utilities and their relationship to existing utilities.
2. The marked-up and colored-in prints will be used as a guide for determining the progress of the work installed. They shall be inspected at the architect's or construction manager's discretion and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment may not be approved until the drawings are accurate and up-to-date.
3. The mechanical contractor shall provide one set of marked plans to the Engineer for his review and approval of record drawings. The approved plans shall be returned to the contractor for his CAD preparation of documents using AutoCad 2012 to indicate correct location of all equipment, piping, etc. as installed on project. The final record drawings shall be submitted in accordance with ASHRAE Standard 90.1, Section 6.7.2.1 within 80 days after the acceptance of the project.
4. The drawings shall provide an accurate and complete record of the work as installed.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS:

- A. All equipment and materials required for installation under these specifications shall be new manufactured and without blemish or defect. All equipment shall bear labels attesting to Underwriter Laboratories approval where subject to Underwriters Laboratory label service. Where no specific indication as to the type of material or equipment is indicated a first class standard article shall be furnished.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code ratings, UL label, or other data which is

die-stamped into the surface of the equipment shall be stamped in a location easily visible. It is the intent of the specifications that wherever manufacturers of a product are specified any substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction such as lesser heat exchange surface, etc.). Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases equipment is oversized to allow for pick-up loads which cannot be delineated under the minimum performance.

- C. Substituted equipment where permitted or approved, must conform to space requirements, whether approved or not or shall be replaced at the HVAC contractor's expense. Any modification of related systems as a result of substitutions shall be made at the HVAC contractor's expense.
- D. Note the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Engineer, Architect, or any other Owner's Representative, attests to the dimensional accuracy or the ability of the material or equipment involved or the mechanical performance of the equipment.

2.2 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. It is the purpose of this specification not to exclude competition between manufacturers of similar equipment.
- B. Where items are specified as "or approved equivalent" prior approval must be obtained from the Engineer. Said approval does not intend to obligate the Engineer in the event shop drawings submitted do not indicate equality of materials, workmanship or function and the right to reject substitutes shall remain the prerogative of the Engineer.
- C. In all cases regardless of method of submission, the HVAC contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed. Minor modifications to suit standard manufactured items are acceptable if approved by Engineer.
- D. Should contract documents fail to describe particular materials or goods to be used, then it shall be the duty of HVAC contractor to inquire of Engineer as to what is to be used and to supply it at HVAC contractor's expense.
- E. HVAC contractor shall promptly remove, at own expense, rejected materials from site of work.
- F. When material has been approved, no change in brand or make will be permitted without approval of Engineer.

2.3 NAMEPLATES:

- A. All items of operation equipment used on the project shall be provided with a nameplate mounted in a conspicuous place on the unit. Plate shall be embossed metal or stamped metal securely fastened to the unit.
- B. The plate shall contain the following information:

1. Manufacturer's name and address
2. All approval stamps, AGA, UL, Etc. as hereinafter specified.
3. Complete capacity and operating data as approved by Engineer
4. Motor Characteristics
5. Serial number and code numbers
6. Date of manufacturer

2.4 V-BELT DRIVES:

- A. Shall be rated for not less than 150 percent of the motor nameplate horsepower. Motor sheaves for motors 50 hp and under shall be adjustable to provide a plus or minus 20 percent speed variation from designed operating rpm. All V-belt drives on motors over 3 HP shall have a minimum of 2 belts. Belt drives shall be isolated by an approved expanded metal belt guard or by enclosing within the unit housing. Where belt guards are used, they shall be fabricated so as to allow a plus or minus 6 " variation in center line distances between driver and driven shafts. Access to ends of shafts shall be provided to allow for rpm readings. Fixed sheaves shall be provided on all motors over 50 hp with allowance for 1 change of sheaves.

PART 3 - EXECUTION

3.1 WORKMANSHIP:

- A. Workmanship shall be of best quality. Good appearance of finished work shall be of equal importance with its mechanical efficiency. No make-shifts shall be permitted anywhere in work and all portions of work shall be so laid out and installed that work as a whole is of uniform quality and appearance.

3.2 PROTECTION OF EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping and ductwork shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping and ductwork.
- D. The HVAC contractor shall be responsible for the work damaged by him in executing his contract. Any work damaged by the HVAC contractor shall be replaced by him and placed in perfect condition without extra cost.

3.3 CONTIGUOUS WORK:

- A. If any part of the HVAC contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not

executed by him, the contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the HVAC contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions.

3.4 CERTIFICATES OF INSPECTION AND APPROVAL:

- A. Upon completion of work, HVAC contractor shall furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.5 SLEEVES AND OPENINGS:

- A. All sleeves and openings required shall be located and provided by the HVAC contractor for his portion of the work. Core drilling for missed sleeves shall be provided by the delinquent contractor.
- B. In order to minimize liquid leakage or transfer of air between floors, it is the intent that pipe penetrations of floors (except in plumbing chases) be held to a minimum. Where it is necessary to penetrate floors, the pipe shall pass through sleeves set in the concrete, and the space between the pipe and sleeve shall be caulked to make it air tight.

3.6 ACCESS TO EQUIPMENT AND VALVES:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.
- C. Where devices are to be concealed in walls or above non-removable ceilings, the HVAC contractor shall furnish the required access panels to the GC for installation for their respective equipment. Access panels shall be of such size to permit working room.
- D. Size of panels shall be 12" x 12" square, minimum, for all wall panels and 24" x 24", minimum, for ceiling panels.

3.7 COORDINATION:

- A. The HVAC contractor is cautioned that the building has an unusually high quantity of piping, ducts, conduits, and other mechanical equipment, and space is limited. The HVAC contractor shall offset pipes as required to avoid interference at no additional cost to the Owner. Generally pipes in which grade must be maintained, such as waste and storm drain piping, and sprinkler piping, shall have first priority. Other pipes shall be offset as required to avoid those items. The HVAC contractor will be required to prepare coordinated shop drawings.
- B. The HVAC contractor shall coordinate the work of his trade and other trades in order that interference between plumbing, mechanical, electrical, architectural and structural work will be avoided. Piping, ducts, conduits, etc. shall be kept as close as possible to ceiling, walls, columns, etc. in order to take up the minimum amount of space; and all offsets, fittings, etc. required shall be furnished without additional cost to the Owner. In case interferences develop, the Engineer will decide which equipment shall be relocated regardless of which was first installed.
- C. The HVAC contractor shall cooperate closely with the General Contractor and all other contractors on the job in order that the job will progress smoothly to its completion. He shall lay out his pipe in advance of pouring floors, or installing walls, shall provide to the General Contractor the location and size of any openings he may require, and shall furnish for the installation by the General Contractor any sleeves, forms, inserts, or hangers required for his work. In the event of failure to do these things at the proper time, or improper location of the required items, the cutting and patching required to rectify the errors shall be done by the HVAC contractor who installed the original material being cut but shall be paid by the contractor at fault, as determined by the Engineer, at no additional cost to the Owner.
- D. All equipment shall be installed with sufficient access and clearance for maintenance, repairs, and replacement. In the event that it appears necessary to install equipment without proper access or clearance, the work shall be stopped until written permission is received from the Engineer to install the equipment. Pipes shall be installed in such a way as to allow maximum headroom where pipes are in occupied areas. Valves shall be located in such a position that they are easily accessible and so that the valve handle can be easily turned to full open or full closed positions.

3.8 PHASING OF WORK:

- A. All work connected to systems in use, utilities or services presently in use by Owner or Utility Company shall be cleared for shutdown with Owner 72 hours before disruption of services is desired. The Owner reserves the right to postpone any work of this nature to coincide with his operational procedure. The maximum shutdown period for any services is 8 hours unless previous approval for a longer period is obtained from the Owner. Any damage incurred in facilities by extended shutdown beyond period allowed shall be repaired by this contractor at no expense to the Owner. Request for a shutdown shall be in writing stating utility to be taken out of service, required length of shutdown period, and desired date and hour of shutdown.

3.9 CHASES, CUTTING AND PATCHING:

- A. In new construction, chases in walls for any work to be installed by this HVAC contractor will be provided by the general contractor provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the general contractor's work.

- B. If this contractor should neglect to furnish the required information and by reason of his neglect chases and openings are not provided, the HVAC contractor shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.
- C. The cutting of chases, openings, or holes in floors and ceilings shall be done in a manner as not to endanger the stability of the structure or any part thereof. The HVAC contractor shall not in any case cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs resulting from cutting shall be under the supervision of the Superintendent of the General Contractor.

3.10 CUTTING AND PATCHING

- A. Cut, channel, chase and drill floors, walls partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair cut surfaces to match adjacent surfaces.

3.11 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the architect for clarification and resolution.
- B. Do not proceed with fabrication and/or installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.12 JOB CONDITIONS:

- A. Safety: Observe all required safety regulations and the manufacturer's warnings and instructions during the storage, handling and application of materials.
- B. Necessary precautions shall be taken to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion or other harm.
- C. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at the end of each day's work, in accordance with all applicable federal, state and local codes.

3.13 WARRANTY

- A. The equipment as covered in this Division shall be provided with parts and labor warranty against defects in material and workmanship for a period of 12 months from final project acceptance. Provide longer warranties for equipment/components where specified.

END OF SECTION 23 00 10

SECTION 23 00 50 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DEFINITION:

- A. Work under this section of the specifications shall include but not necessarily be limited to items common to sections:

1. 23 00 60 Pipe and Pipe Fittings
2. 23 00 80 Piping Specialties and Accessories
3. 23 01 00 Valves

- B. In all cases, work specified in this section of the specifications shall be compatible with all other specification sections.

1.2 SUBMITTALS:

- A. Shop drawings shall be submitted on all items in accordance with the provisions of Section 23 00 10.

- B. Submit shop drawings on the following:

1. Fire Rated Sealants
2. Access Doors
3. Pipe Plugs
4. Pipe Hangers and Supports
5. Valves
6. Fire Rated Sealant
7. Strainers
8. Sleeves, Seals, Escutcheons
9. Pressure Regulating/Reducing Valves
10. Flow Sensors and Meters
11. Vibration Isolators
12. Air Vents
13. Unions

1.3 COORDINATION:

- A. The HVAC contractor shall coordinate with the other contractors as required to produce workable, controllable systems. Generally, all controls and equipment shall be furnished and installed by the contractors unless otherwise noted.

END OF SECTION 23 00 50

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SECTION 23 00 60 - PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.1 SCOPE OF DIVISION 23 WORK:

- A. This work shall consist of furnishing all labor, material, equipment and services necessary for the installation of all equipment specified hereinafter.
- B. Systems, piping and components principally relevant to this section include:
 - 1. Hot water supply and return piping and fittings
 - 2. Condensate piping and fittings.
 - 3. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS:

2.1 HOT WATER SUPPLY AND RETURN PIPING AND FITTINGS:

- A. The pipe material shall be Schedule 40 black steel and shall conform to ASA B36.20.
- B. At contractor's option, pipe 2" and smaller shall be copper Type 'L' tubing with 125 PSI solder joint and wrought copper fittings.
- C. Fittings 2" and smaller shall be of screwed cast iron and shall conform to ASA B16.3, B2.1 and ASTM A126 Class A or malleable iron.
- D. Fittings 2½" and larger shall be welded steel fittings.
- E. All steel fittings shall conform to ASA B16.4, B2.1 and ASTM-A126 Class A.
- F. Welding fittings: With the exception of pipe welded end-to-end, all welding joints shall be made by the use of one-piece welding neck flanges, nozzles, elbows, tees, etc. All welding elbows shall be long radius elbow. Welding end fittings shall have the same bursting pressure as pipe of the same size and schedule. Tee fittings shall be one piece except that shaped nipples are permitted where branches are at least two pipe sizes less than the main.
- G. Flanged fittings: Flanges and flanged fittings shall conform to ASA Standard B16.5 and ASTM-A181 for 150 lb. and 300 lb. class.

2.2 COMPOUNDS, SOLDER AND LEAD:

- A. Pipe Thread Compound:
 - 1. Crane, Dixon, Rutland, or equal, or Teflon tape type.
- B. Solder-joint solder: 95% tin and 5% antimony. Joints on larger pipe shall be made with a high-temperature brazing solder, Sil-phos or equal, except use 95-5 at valves.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. For purposes of clarity and legibility, the contract documents are essentially diagrammatic and, although size and location of piping are drawn to scale wherever possible, the mechanical contractor shall make use of all data in all of the contract documents and shall verify this information at building site.
- B. The contract documents indicate required size and points of termination of pipes and suggest proper routes of piping to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that the contract documents indicate all necessary offsets, and it shall be the work of this section to install piping in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner. The contractor shall fully inform himself regarding any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. He shall exercise due and particular caution to determine that all parts of his work are made quickly and easily accessible. Although the locations of the equipment and piping may be shown on the contract documents in certain positions, the contractor shall be guided by the architectural details and conditions existing at the job, correlating this work with that of others. Provide all offsets as required to produce a neat, workmanlike arrangement.
- C. The mechanical contractor shall study all drawings and specifications to determine any conflict with ordinances and statutes. Likewise, any errors or omissions shall be reported prior to bidding. Any changes shall be shown in drawings made by this contractor, and any additional work shall be performed at no additional cost to the Owner.
- D. Submittal of bid shall indicate the contractor has examined the site and contract documents and has included all required allowances in his bid. No allowance shall be made for any error resulting from contractor's failure to visit job sites and to review contract documents and bid shall include costs for all required drawings and changes as outlined above, all at no additional cost to the Owner.
- E. All piping shall be installed to prevent unusual noise from the flow of water under normal conditions. Insert one (1) inch strip of hair felt to isolate all piping from any direct contact with any part of the building, framing, conduit, etc.
- F. Springing, bending or forcing of pipe will not be allowed. Use fittings for all offsets or changes in alignment of piping. Center hubs so cast iron or clay pipe will lay straight without pinched joints.
- G. All changes in directions shall be made with approved fittings. Mitering, saddling or welding of smaller pipe and larger piping is prohibited.
- H. Pipe openings shall be closed with caps or plugs during installation. Rags and tin cans are not considered suitable closures. Pipe openings in terrazzo floors shall have semi-permanent closures during construction.
- I. Damage by leaks - The mechanical contractor shall be responsible for damage to the grounds, walks, road, buildings, pipe systems, electrical systems and their equipment and contents, caused by leaks in the piping system being installed or having been installed herein. He shall repair at his expense all damage so caused. All repair work shall be performed as directed by the Architect.

- J. The use of chemicals or so-called "Stop-Leak" compounds will not be permitted at any time.
- K. Unions shall be provided at connection to all equipment.
- L. Escutcheon plates shall be provided at all exposed penetrations of walls, ceilings, floors, etc.
- M. All items of equipment shall be provided with approved vacuum breakers to prevent backflow, as required by State Health Department and local authorities having jurisdiction. All waste connections shall be installed with approved air break fittings to comply with the above requirements. Vacuum breakers where shown on Drawings or required shall be angle pattern with built-in lift type check valves as manufactured by Bidoro Manufacturing Company or approved equal.
- N. Bypass Piping: Except as otherwise indicated, fabricate and install bypass piping using same materials and in same plane as connected piping, but one pipe size smaller. Include valve in bypass piping. Install bypass piping around control valves, PRV stations and as shown on drawings.
- O. Drain Valves: Install on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain hot/condenser water piping system.

3.2 PIPE JOINING METHODS:

- A. Steel Pipe Joints: (2" or smaller)
 - 1. Thread pipe with tapered pipe threads in accordance with ANSI B2.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
 - 2. Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B31.1. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.
- B. Pipe Larger Than 2":
 - 1. Weld pipe joints in accordance with ASME Code for Pressure Piping, B31.
 - 2. Weld pipe joints of exterior water service pipe in accordance with AWWA C206.
 - 3. Install flanges on all valves, apparatus, and equipment. Weld pipe flanges to pipe ends in accordance with ASME B31.1.0 Code for Pressure Piping. Clean flange faces and install gaskets. Tighten bolts to torque specified by manufacturer of flange and flange bolts, to provide uniform compression of gaskets.
 - 4. Thoroughly clean tube surface and inside surface of the cup of the fittings, using very fine emery cloth, prior to making soldered or brazed joints. Wipe tube and fittings clean and

apply flux. Flux shall not be used as the sole means for cleaning tube and fitting surfaces.

5. Joints for other piping materials are specified within the respective piping system sections.
6. Weld pipe joints in accordance with ANSI B31. Weld pipe joints in accordance with recognized industry practice and as follows:
 - a. Weld pipe joints only when ambient temperature is above 32°F. Heat pipe to 60°F prior to welding.
 - b. Bevel pipe ends at a 37.5° angle, smooth rough cuts, and clean to remove slag, metal particles and dirt.
 - c. Install welding rings for butt welded joints.
 - d. Use pipe clamps or tack-weld joints with 1" long welds; 4 welds for pipe sizes to 10", 8 welds for pipe sizes 12" to 20".
 - e. Build up welds with stringer-bead pass, followed by hot pass, followed by cover or filler pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.
 - f. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.
7. At installer's option, install forged branch-connection fittings wherever branch pipe is indicated; or install regular "T" fitting.
8. Flanged Joints: Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

3.3 HOT WATER SUPPLY AND RETURN PIPING:

- A. The drawings indicate schematically the size and location of piping. Piping shall be set up and down and offset to meet field conditions and coordination between trades without additional cost.
- B. Pipework shall conform fully to the following requirements:
 1. Provide proper provision for expansion and contraction in all portions of pipework, to prevent undue strains on piping or apparatus connected therewith. Provide double swings at coil connections riser transfers and other offsets whenever necessary to take up expansion. Arrange riser branches to take up motion of riser.
 2. Approved bolts, gaskets, flanges (screwed or welded) shall be installed at all apparatus and appurtenances, and wherever else required to permit easy connection and disconnection. Screwed unions shall be provided as specified on piping 2-1/2" or less.
 3. All piping connections to coils and equipment shall be made with offsets provided with screwed or welded bolted flanges so arranged that the equipment can be serviced or removed without dismantling the piping.
 4. Provide dielectric unions or insulated flanges for copper or brass to steel piping system joints.

5. If, after system is in operation, any apparatus is stratified or air bound (by vacuum or pressure), they shall be re-piped with new, approved and necessary fittings, air vents, or vacuum breakers at no extra cost. If connections are concealed in furring, floors, or ceilings, the HVAC contractor shall bear all expense of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.

C. Miscellaneous drains, vents and reliefs are to be provided as follows:

1. Provide 3/4" hose and drain valves near the heel of all water risers in an accessible location.
2. Miscellaneous drains, vents, reliefs, and over-flows from tanks, equipment, piping, relief valves, pumps, etc. shall be run to the nearest open sight drain or roof drain. Provide 3/4" drain valves for complete drainage of piping, including the system side of all pumps.
3. Provide domestic water connections from valves outlets to any equipment requiring same, including expansion tanks.

D. Screwed piping shall conform to the following:

1. Pipe Nipples: Any piece of pipe 3" in length or less shall be considered a nipple. All nipples with unthreaded portion 1-1/2" and less shall be extra heavy. Only shoulder nipples shall be used. No close nipples will be provided.
2. Screw threads shall be cut clean and true: screw joints made tight without caulking. No caulking will be permitted. A non-hardening lubricant will be used. No bushings shall be used. Reductions, otherwise causing objectionable water or air pockets, to be made with eccentric reducers or eccentric fittings. All pipe shall be reamed out after cutting to remove all burrs.

E. Welding piping shall conform to the following:

1. All welded joints for steel pipe shall be of the open V-butt following approved welding procedures for metallic arc or oxyacetylene (from pipe sizes 2" and under) carbon steel welded pipe joints. Pipe shall be millbeveled or machine beveled by this trade. All scale and oxide must be removed with hammer, chisel or file, and the bevel left smooth and clean.
2. Weld metal shall be thoroughly fused with base metal at all sections of weld and penetration of weld shall include un-beveled portion and shall extend to inside walls of pipe.
3. Pitch water piping upward in direction of flow to ensure adequate flow without air binding, and to prevent noise and water hammer. Branch connection to mains are to be made in such a manner to prevent air trapping and permit free passage of air. To meet job conditions mains shall be set up to maintain headroom, and clear other trades. Provide oversized float operated automatic air vent (with valve and strainer) at all high points in hot and chilled water piping, particularly at the highest points of return mains and risers. Avoid 90 degree lift set-ups in supply lines by using 45 degree ells. Where 90 degree lifts exceed 12" install automatic air vent in supply lines. All lifts in return lines shall be installed with automatic air vents to an open sight drain if the vent is concealed, or to within two feet of the floor within machine rooms.

END OF SECTION 23 00 60

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SECTION 23 00 80 - PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1. Sleeves, Seals and Escutcheons
 - 2. Fire Rated Sealant
 - 3. Drip Pans
 - 4. Access Doors
 - 5. Pipe Hangers, Supports and Anchors
 - 6. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 SLEEVES, SEALS AND ESCUTCHEONS:

- A. Provide sleeves for each pipe passing through walls, floors and roof.
- B. Sleeve Material:
 - 1. Type Designation
 - 1. Schedule 40 galvanized steel pipe.
 - 2. Schedule 40 galvanized steel pipe with a continuous welded stop of 1/4" steel plate extending outside of sleeve a minimum all around, similar to R&S Manufacturing Corp. Fig. 204.
 - 3. Cast iron pipe sleeve with center flange, similar to James B. Clow and Sons No. F-1430 and F-1435.
 - 4. Schedule 40 galvanized steel pipe with flashing clamp device welded to pipe sleeve or watertight sleeves, similar to Josam 1870-A2, 1870, 1940-C with oakum and caulking compound.
- C. Sleeve Sizes:
 - 1. Sleeves for uninsulated pipe shall be two pipe sizes larger than pipe passing through a minimum of 1/2" clearance between inside of sleeve and outside of pipe.
 - 2. Sleeves for insulated piping shall be adequate size to accommodate the full thickness of pipe covering with minimum clearance for packing and caulking.

D. Sleeve Lengths:

<u>Location</u>	<u>Sleeve Length</u>
Floors	Equal to depth of floor construction including finish. In waterproof floor construction sleeves to extend minimum of 2" above finished floor level.
Partitions	Equal to thickness of construction and terminate with surfaces.

E. Sleeve and Caulking and Packing:

<u>Type Designation</u>	<u>Caulking and Packing Requirements</u>
A	Space between pipe and sleeve packed with oakum or hemp and caulked watertight.
B	Space between pipe or pipe covering and sleeve shall be caulked with a fire resistant sealant.

F. Sleeve Application:

<u>Sleeve Type</u>	<u>Location</u>	<u>Sleeve Caulking & Packing Type Designation</u>
2	Interior walls and floors	B
2	Membrane, waterproof floor, roof and wall construction	B
	Note: Another trade will install membrane up around sleeve and inside sleeve.	
3 or 4	Exterior walls	A
5	No membrane, waterproof, roof and wall construction where flashing is required.	A or B

G. Escutcheons:

1. Provide escutcheons on all exposed piping passing through walls, floors, partitions and ceilings. Chrome-plated, stamped steel, hinged, split-ring escutcheon, with set screw. Inside diameter shall closely fit pipe outside diameter, or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings.
2. Escutcheons shall be held in place by internal spring tension or set screws.

H. Application:

<u>Location</u>	<u>Escutcheon Material</u>
Finished spaces	Anodized aluminum chrome-plated brass
Unfinished spaces, excluding mechanical equipment rooms	Plain brass, cast iron or aluminum

I. Mechanical Sleeve Seals:

1. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.2 FIRE RESISTANT SEALANT:

- A. Penetrations through floors and walls noted elsewhere shall be sealed with Fire Resistant Sealant, so as to prevent the spread of smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that after completion of the seals, the original fire rating of the floor or wall is maintained.
- B. Submit shop drawings showing each condition requiring penetration seals indicating proposed UL systems materials, methods of installation and actual adjacent construction.
- C. Submit a copy of UL illustration of each proposed system indicating manufacturer approved modifications.
- D. Manufacturer's Data: Submit copies of manufacturer's specifications, recommendations, installation instructions, and maintenance data for each type of material required. Include letter indicating that each material complies with the requirements and is recommended for the applications shown.
- E. Applicator Qualifications: Two years experience installing UL Classified fire stopping materials.
- F. Manufacturer: Subject to compliance with requirements, provide products of one of the following manufacturers:
 1. 3M Company
 2. Hilti
 3. Nelson
- G. Provide materials classified by UL to provide fire stopping equal to time rating of construction being penetrated.
- H. Provide asbestos free materials that comply with applicable codes and have been tested under positive pressure in accordance with UL 1479 or ASTM E814.

2.3 DRIP PANS:

- A. Examine the Drawings and, in cooperation with the Electrical Trade, confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than two feet from a vertical line to electric motor controllers, switchboards, panelboards or similar equipment.
- B. Where the installation of piping does not comply with the requirements of preceding paragraph, and where feasible, the piping shall be relocated if not practical as determined by the engineer.
- C. The HVAC contractor shall provide drip pans as follows:
 - 1. Provide and erect a drip pan of 18 gauge galvanized steel under every pipe which is within 2'- 0" of being vertically over any motor, controllers, switchboards or the like.
 - 2. Each drip pan shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.
 - 3. In lieu of such separate drip pan, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided extending 2'-0" in all directions beyond the electrical item, over which such piping has to run.
 - 4. HVAC contractor shall provide 3/4" drain to nearest floor drain or slop sink as approved.

2.4 ACCESS DOORS IN FINISHED CONSTRUCTION:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Where devices are to be concealed in walls or above non-removable ceilings, the mechanical contractor shall furnish the required access panels to the general contractor for installation.
- C. Size of panels shall be larger than the devices for accessibility and shall not be less than 16"x16" for all panels. Where the opening must allow adequate room for a person to pass through, a 24"x24" panel shall be provided.
- D. Construction of panels shall comply with the following:
 - 1. For Masonry, Tile or Wallboard Surfaces - 16 gauge steel frame, 16 gauge steel 1" wide flange, 16 gauge steel panels, concealed hinges, screwdriver operated cam lock, baked enamel prime coat. Final painting to match interior decor by general contractor. Panel shall be Milcor Style M.
 - 2. For Acoustical Tile Ceilings - flangeless construction of even tile module, 16 gauge steel frame, 18 gauge recessed door panel for receiver acoustic tile by general contractor, continuous hinge, flush screwdriver operated cam latch, white prime coat finish; Milcor Style A7. Access panels will not be required in accessible type ceilings.
 - 3. For Plastered Ceilings or Walls - concealed flange, recessor door panel to receive plaster by GCC, 16 gauge galvanized steel frame, 18 gauge galvanized steel panel, 3.4 gauge

galvanized steel lath continuous hinges, flush latch, white prime coat finish. Final painting to match interior decor by GC; Milcor Type AP.

- 4. For Fire Rated Partition - Access doors in fire rate walls shall be 1-1/2 hour B rated and shall bear the UL label. Doors shall be fabricated of steel and shall be provided with a baked enamel prime coat over a phosphate coating. Doors shall be Milcor.

2.5 PIPE HANGERS, SUPPORTS AND ANCHORS:

- A. All bracket, clamp and rod sizes indicated in this Specification are minimum sizes only. The installing trade shall be responsible for structural integrity of all supports. All structural hanging materials except variable spring units shall have a safety factor of 5 built in.
- B. Heavy-Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS Standards.
- C. Provide 120 degree shields at hangers for insulated piping.
- D. For copper tubing, supports shall follow schedule and specifications. Supports for uncovered lines shall be especially designed for copper tubing, shall be of exact outside diameter of tubing and shall be copper plated.
- E. All hangers on piping including clevis hangers, inserts, clamps, stanchions, brackets, shall be dipped in zinc chromate primer before installation. Rods shall be galvanized.
- F. Pipe supports shall be of the following type and figure number as manufactured by F&S, Anvil, Elcen, and as hereinafter indicated.

Pipe Hanger Schedule	F&S	Anvil
Multi-J hood plate	92	93
Clevis hanger	86	260
120 degree shield	980	167
Pipe saddle	900	160
	Series	1700 Series
U-bolt	37	137
Adj. steel pipe stanchion	421	259
Welded steel bracket	800	195
	or 801	or 199
Single bolt riser clamp	91 or 93	261
Double bolt riser clamp	92	Standard
		40
Double bolt pipe clamp	89	295
Welded beam attachment W/B & N	966A	66
Insert	180-A	280
	180-B	

2.6 MISCELLANEOUS METALS

- A. Powder-Actuated Drive-Pin Fasteners: Powder-actuated-type, drive-pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

- B. Mechanical-Anchor Fasteners: Insert-type attachments with pull out and shear capacities appropriate for supported loads and building materials where used.
- C. Structural Steel: ASTM A 36/A 36M, steel plates, shapes and bars, black and galvanized.
- D. Grout: ASTM 1107, Grade B, factory-mixed and packaged, non-shrink and non-metallic, dry, hydraulic-cement grout.
 - 1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
 - 2. Properties: Non-staining, noncorrosive, and non-gaseous.
 - 3. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.
- B. Prior to installation of hangers, supports, anchors and associated work, the mechanical contractor shall meet at project site with the A/E general contractor, installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect/Engineer for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified. This meeting shall be arranged by the mechanical contractor.

3.2 INSTALLATION OF BUILDING ATTACHMENTS:

- A. Install building attachments at required locations (obtain structural engineer's approval), within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.3 INSTALLATION OF HANGERS AND SUPPORTS:

- A. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping, ductwork or other supported mechanical or electrical items.

- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Support fire-water piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- E. Provisions for Movement: Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- F. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.
- H. Insulated Piping: Comply with the following installation requirements.
- I. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
- J. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.

3.4 INSTALLATION OF EXPANSION LOOPS:

- A. Provision shall be made in all piping systems for expansion and contraction. It is preferred to absorb expansion by means of pipe loops or expansion bends wherever feasible. Where this is not possible, expansion joints shall be used.
- B. "U" type expansion loops or expansion bends shall be provided with guides on each side of loop and at appropriate distances from expansion bend.
- C. Fabricate expansion loops as indicated, in locations indicated, and elsewhere as determined by installer for adequate expansion of installed piping system. Subject loop to cold spring which will absorb 50% of total expansion between hot and cold conditions. Provide pipe anchors and pipe alignment guides as determined by installer to properly anchor piping in relationship to expansion loops.

3.5 INSTALLATION OF FIRE RESISTANT SEALANT:

- A. Install fire resistant sealant materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.
- B. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspection by applicable code authorities. Perform under this section patching and repairing of fire stopping caused by cutting or penetration by other trades.

3.6 INSTALLATION OF DRIP PANS:

- A. Each pan shall be soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining.

3.7 INSTALLATION OF ACCESS DOORS:

- A. The doors shall be installed by the general contractor.

3.8 INSTALLATION OF PIPE HANGERS, SUPPORTS AND ANCHORS:

- A. Supports, anchors, hangers and guides shall be provided for all horizontal and vertical piping in accordance with MSS Standards.
- B. All pipe supports shall be of type and arrangement as hereinafter specified. They shall be so arranged as to prevent excessive deflection and avoid excessive bending stresses.
- C. Provide all steel and concrete required for support and anchoring of pipes other than shown on Structural or Architectural Drawings.
- D. Structural Engineer must approve method of hanging before work is started. HVAC contractor shall bear all responsibility for materials and workmanship as described in this section and shall make sure that all hangers and supports are properly and permanently connected to building structure.
- E. All pipe supports shall be designed to avoid interference with other piping, hangers, electrical conduits and supports, building structures and equipment.
- F. Spacing of pipe hangers and pipes other than steam and condensate shall comply with the following schedule:

Spacing of Hangers
(max. ft.)

<u>Size of Pipe</u>	<u>Copper</u>	<u>Steel</u>	<u>Cast Iron</u>
1/2"	6	8	-
3/4" to 1"	8	8	-
1-1/4" to 3"	10	10	5
3-1/2" & Over	10	12	5

3.9 INSTALLATION OF MECHANICAL SLEEVE SEALS:

- A. Mechanical Sleeve Seals: Loosely assemble rubber links around pipe with bolts and pressure plates located under each bolt head and nut. Push into sleeve and center. Tighten bolts until links have expanded to form watertight seal.

3.10 INSTALLATION OF ANCHORS:

- A. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer of loading and stresses to connected equipment.

- B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure. Comply with ANSI B31 and with AWS Standards.
- C. Anchor Spacings: Where not otherwise indicated, install anchors at ends of principle pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.11 ADJUSTMENT OF HANGERS AND SUPPORTS:

- A. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.12 EQUIPMENT BASES:

- A. Concrete housekeeping bases shall be provided by HVAC contractor. Prepare scaled layouts of all required bases with dimensions of bases, and location to column center lines. Furnish templates, anchor bolts, and accessories, necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands.

END OF SECTION 23 00 80

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SECTION 23 01 00 – VALVES

PART 1 - GENERAL:

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material, equipment, and services necessary for the installation of all equipment specified hereinafter. Provide valve data for approval.
- B. Equipment and components principally relevant to this section include:
 - 1. Gate Valves
 - 2. Check Valves
 - 3. Globe Valves
 - 4. Balancing Cocks
 - 5. Ball Valves
 - 6. Butterfly Valves
 - 7. Other items where shown on the drawings or as specified.

PART 2 - PRODUCTS

2.1 VALVES - GENERAL:

- A. Furnish and install valves shown on the drawings, specified herein and/or necessary for the control and easy maintenance of all piping and equipment. All valves shall be first quality of approved manufacture, shall have proper clearances, and shall be tight at the specified test pressure. Each valve shall have the maker's name or brand, the figure or list number and the guaranteed working pressure cast on the body and cast or stamped on the bonnet, or shall be provided with other means of easy identification. All valves shall be the product of one manufacturer except for special applications. Valves shall be Nibco, Hammond, or Fairbanks. Where figure numbers of one manufacturer are stated, equivalent figure numbers can be substituted.
- B. Valves shall be of minimum working pressure and materials as fittings specified for the service except as herein modified. All gate and globe valves shall be suitable for repacking under pressure. Regardless of service, valves shall not be designed for less than 125 pounds per square inch steam working pressure.
- C. All throttling valves shall have a means of indicating valve position.

2.2 BRONZE GATE VALVES:

- A. Screwed Ends, Union Bonnets, Solid Wedge:
 - 1. Bronze Gates 125 # WSP
 - a. Hammond IB631
 - b. Nibco T-135
 - c. Fairbanks U-0253

B. Solder Ends, Screwed Bonnets:

1. Bronze Gates 125# WSP
 - a. Hammond IB648
 - b. Nibco S-134
 - c. Fairbanks 0282

C. Flanged Ends:

1. Iron Gates 125# WSP
 - a. Hammond IR1140
 - b. Nibco F-617-0
 - c. Fairbanks 0405

2.3 CHECK VALVES:

A. Screwed ends, Union Bonnets:

1. Bronze Checks 125# WSP
 - a. Hammond IB944
 - b. Nibco T-433-B
 - c. Fairbanks 0600

B. Solder Ends, Screwed Bonnets:

1. Bronze Checks 125# WSP
 - a. Hammond IB-945
 - b. Nibco S-433-B
 - c. Fairbanks 0680

C. Flanged Ends:

1. Iron Checks 125# WSP
 - a. Hammond IR 1124
 - b. Nibco F-918-B
 - c. Fairbanks 0702

D. Swing check valves used as vacuum breakers: 15 degrees swing check, composition disc, 150 WSP: Nibco Fig T-433-Y or equal. Valves shall be 3/8" size.

2.4 GLOBE VALVES:

A. Screwed ends, union bonnets (composition or Teflon discs)

1. Bronze Globes 150# WSP
 - a. Hammond IB413T (2-1/2" IB420)
 - b. Nibco T-235-Y
 - c. Fairbanks U-01

B. Flanged Ends:

1. Iron Globes 125# WSP
 - a. Hammond IR 116
 - b. Nibco F-718-B
 - c. Fairbanks 0131

2.5 BALANCING COCKS:

- A. Valves 2" and smaller shall be of bronze body, bronze ball and Teflon seat construction, and rated at 175# and 200 degrees F.
- B. Nordstrom Fig. No. 143. Bronze body, square head, tapered plug and washer, lubricated fittings. Provide lubricant and gun, recommended for service intended. Where balancing cocks are indicated, circuits setters may be used.

2.6 CIRCUIT SETTERS:

- A. Circuit setters shall include brass balancing cock and taps for taking differential pressure readings. They shall be as manufactured by B&G, Taco, Armstrong or Thrush.

2.7 BALL VALVES (2" AND BELOW)

- A. Nibco T-595W
- B. Jenkins 1100T
- C. Crane or approved equal

2.8 BUTTERFLY VALVES:

- A. Butterfly valves shall have aluminum bronze floating type disc; Buna-N hardback type seat for temperatures up to 170°, EPT seat for temperatures over 170 deg., stainless steel dry journal type stems. Bodies shall be wafer and lug type with extended necks adequate for 2" insulation above companion flanges. Operators shall be on-off or infinite throttling lever type in sizes 2" and 6", and gear operators for 8" and above.
- B. The valves shall close drop-tight from 28" vac to 150 psi pressure differential.
- C. They shall be Demco, Trane, Monarch, Dover, or approved equal.

2.9 GASKETS:

- A. Gaskets shall be manufactured by Thermoseal, Inc. or approved equivalent. Gaskets shall be metallic/non-asbestos type and rated for application. Bolts shall be high strength.

- B. Shop Drawings shall be submitted indicating suitability, details of installation and engineering calculations outlining criteria necessary to provide zero leakage. Gaskets shall be in compliance with the following standards:
1. ASTM F37 Test Method for Sealability
 2. DIN 3535 Test Method for Gas Permeability
 3. ASTM F38 Test Method for Creep Relaxation
 4. ASTM F146 Test Method for Fluid Resistance
 5. ASTM F36 Test Method for Compressibility and Recovery
 6. ASTM F104 Standard Classification System
 7. FSA-NMG-204 Standard Test Method for Performance in High Pressure, Saturated Steam
 8. Klingsil Gasket Assembly Stress Recommendations
- C. The suggested contact: Thermoseal / Lisa Chrisman (937-498-2222)

PART 3 - EXECUTION

3.1 GENERAL:

- A. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
- B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- C. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive installation.
- D. Applications Subject to Shock: Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
- E. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- F. Mechanical Actuators: Install mechanical actuators with chain operators where indicated, and where valves 4" and larger are mounted more than 8'-0" above floor in mechanical rooms and where recommended by valve manufacturer because of valve size, pressure differential or other operating condition making manual operation difficult.
- G. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.
- H. Tube Size 2" and Smaller: Soldered-joint valves.
- I. Pipe Size 2" and Smaller: One of the following, at Installer's option:
1. Threaded valves

2. Butt-welding valves
 3. Socket-welding valves
 4. Flanged valves
 5. Flangeless valves
 6. Single flanges valves
- J. Pipe size 2-1/2" and larger: One of the following, at installer's option:
1. Butt-welding valves
 2. Socket-welding valves
 3. Flanged valves
 4. Wafer valves
 5. Single flange valves
- K. Valve System: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- L. Non-Metallic Disc: Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- M. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.
- N. Fluid Control: Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.
- O. Ball valves shall be used in lieu of butterfly valves for equipment shut-off in size 2" and under.
- P. Butterfly valves shall be used in lieu of ball valves or balancing cocks in water circulating systems in sizes 2" and over. Where valve is for isolation for equipment service, the valve shall be of the lug type.
- Q. Valves in positions where unauthorized closing could endanger safety or cause freezeups shall have wrench operation or lock shields and shall be marked with warning signs.
- R. Gate valves, globe valves, and strainers shall be a minimum of the pipe size marked on the drawings. Reductions where necessary because of equipment or automatic valve size shall be made with the proper eccentric reducing fittings immediately adjacent to the inlet and outlet of the automatic valve. Bypasses for automatic valves shall be full size of the valve. Provide a service valve on either side of each piece of equipment.
- S. Provide a Taco Sentinel pitot tube or a B&G circuit sensor for each balancing cock, or butterfly valve used as a balancing cock, which does not have flow read-out.

END OF SECTION 23 01 00

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SECTION 23 01 02 – DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The requirements of The Division 01 specifications, and Section 23 00 10 shall also apply to the work specified in this section.

1.2 DESCRIPTION OF WORK:

- A. The extent of work is defined by the drawings and this specification.
- B. The intent is to provide for the total demolition of portions of the existing building systems and to perform all necessary modifications to that portion of the existing building which shall remain so that it continues to function unaffected by the demolition and associated new construction.

1.3 SPECIAL CONSIDERATIONS:

- A. The drawings indicate the general areas of work involved. However, this contractor shall perform work outside those areas shown as is necessary to comply with the intent of this section.
- B. The contractor shall familiarize himself with the existing building and with the work of all other trades and include all work necessary to comply with the intent of this section.
- C. It shall be understood that field conditions may be encountered during the execution of this contract which will require extension or relocation of existing systems or equipment which are not specifically shown on the drawings, but, which are required to meet the stated intent that the building continue to function unaffected by the demolition and associated new construction. This contractor shall include such work as would normally be expected in an existing building of this age and type.
- D. Should this contractor encounter field conditions which, in his opinion, exceed what would normally be expected in an existing building of this age and type he shall notify the Architect/Engineer immediately, in writing, and request a decision as to the scope of work. The Architect/Engineer shall provide the necessary interpretations and instructions in a reasonable time.

1.4 MATERIALS:

- A. Provide all materials required to complete the work specified and intended by this section.

1.5 DEMOLITION:

- A. The work of mechanical demolition of certain systems in the existing building shall be performed by the mechanical contractor.
- B. The mechanical contractor may subcontract a General Contractor for portions of demolition work that relate to the building walls.

- C. This contractor shall include coordination with the General Contractor and Electrical Contractor and such demolition of the existing mechanical systems as is necessary so that the demolition work of these contractors shall not damage those portions of the mechanical systems which are to remain in service, are to be reused or are to become the property of the Owner.
- D. Turn over to Owner upon request or as noted on drawings the items shown as being removed.
- E. Equipment or materials which are to be reused or turned over to the Owner shall be carefully removed, cleaned and stored in a clean, dry area. Should the contractor encounter such equipment which is not in satisfactory condition for reuse and not in working order, the Contractor shall notify the architect immediately.
- F. Disconnect mechanical and electrical services to all equipment requiring removal. Piping, wiring, ductwork, etc. shall be removed back to the points as shown on the drawings, or as required.

1.6 ADDITIONAL WORK:

- A. Where new wall or floor finishes conflict with existing plumbing and mechanical work which is to remain, relocate the mechanical work involved.
- B. Where existing piping, ductwork, etc. are interrupted by demolition or new work, extend and reconnect those systems. Where those systems must remain in service during the execution of this contract, provide temporary connections until final connections are complete.
- C. Any parts of existing construction which are to remain and which are damaged during demolition and preparatory work or new construction work on the project shall be patched to match existing adjacent surfaces. Patching and finishing of such areas shall conform with all applicable requirements of other technical sections of these specifications, and shall match existing work in material, type, finish, etc.

1.7 DISPOSAL OF DEMOLISHED MATERIALS:

- A. Materials and debris shall be removed from the site as soon as possible, such items shall not be permitted to accumulate. Clean up operations shall be carried on constantly.
- B. Dispose of materials and recycle all recyclable materials in accordance with the Owner's requirements.

END OF SECTION 23 01 02

SECTION 23 01 10 - HYDRONIC WATER SPECIALTIES

PART 1 - GENERAL:

1.1 SCOPE OF WORK:

- A. This work shall consist of furnishing all labor, material equipment and services necessary for the installation of all equipment specified hereinafter.
- B. Equipment and components principally relevant to this section include:
 - 1.
 - 2. Air Vents
 - 3. Unions
 - 4. Strainers
 - 5. Other items where shown on the drawings or as specified.
- C. Provide shop drawings for each item listed above for approval.

PART 2 - PRODUCTS:

2.1 AIR VENTS:

- A. Manual vent - Brass petcock, 1/4" size, with threaded flare fitting for drain tubing connection.

2.2 UNIONS:

- A. Malleable-iron, Class 150 for low pressure service and Class 250 for high pressure service; hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends.

2.3 DIELECTRIC UNIONS:

- A. Provide dielectric unions with appropriate end connections for the pipe materials in which installed (screwed, soldered, or flanged), which effectively isolate dissimilar metals, prevent galvanic action, and stop corrosion.

2.4 STRAINERS:

- A. Y-type Strainers: Provide strainers full line size of connecting piping, with ends matching piping system materials. Screens shall be Type 304 stainless steel, with 3/64" perforations at 233 per square inch.
- B. Provide strainers with 125 psi working pressure rating for low pressure applications, and 250 psi pressure rating for high pressure application.

- C. Threaded Ends, 2" and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with pipe plug.
- D. Threaded Ends, 2 1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.
- E. Flanged Ends, 2 1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.
- F. Butt Welded Ends, 2 1/2" and Larger for Low Pressure Application: Schedule 40 cast carbon steel body, bolted screen retainer with off-center blowdown fitted with pipe plug.
- G. Butt Welded Ends, 2 1/2" and Larger for High Pressure Application: Schedule 80 cast carbon steel body, bolted screen retainer with off-center blowdown fitted with pipe plug.
- H. Grooved Ends, 2 1/2" and Larger: Tee pattern, ductile iron or malleable iron body and access end cap, access coupling with EDPM gasket.

PART 3 - EXECUTION:

3.1 INSTALLATION OF UNIONS:

- A. Install unions adjacent to each valve, and at the final connection to each piece of equipment and elsewhere as indicated.
- B. Install flanges in piping 2 1/2" and larger, where indicated adjacent to each valve, and at the final connection to each piece of equipment.
- C. Install dielectric unions to connect piping materials of dissimilar metals in dry piping systems (gas, compressed air, vacuum).
- D. Install dielectric fittings to connect piping materials of dissimilar metals in wet piping systems (water, steam).

3.2 INSTALLATION OF AIR VENTS:

- A. Provide at all high points of systems where required and/or shown on plans as follows:
 - 1. All vents shall be manual type unless otherwise shown or specified.
 - 2. Install vents so they are easily accessible. Provide access doors where required.
 - 3. Install in tee at all high points of mains and risers. Provide 1-1/4" x 6" air collection chamber to which air vent is to be connected.
 - 4. When piping is concealed, connect 1/2" copper tubing to collection chamber and mount manual valve near access door.

3.3 INSTALLATION OF STRAINERS:

- A. There shall be approved strainers in the inlet connection to each pump, and each automatic control valve, and elsewhere as shown on drawings. The intention is to protect by strainers all apparatus of an automatic character whose functioning would be interfered with by dirt or debris.
- B. Provide approved valved dirt blow off connections for each strainer with the valve located 6" below strainer or as directed. Nipples and valves to be full size of strainer except 1" maximum size blow off tapping. For all strainers, the blow out connection is to terminate in an approved manner, at a point where there will be no risk of flooding or damage.

END OF SECTION 23 01 10

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SECTION 23 02 50 – INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Provide insulation as specified for:
- B. Piping systems including valves, couplings, fittings, flanges, strainers, and expansion joints.
- C. Ductwork - thermal insulation for all pre-conditioned, mixed, supply, return, exhaust, exhaust, and outdoor air ductwork and casings, unless specifically noted otherwise.
- D. Equipment, including tanks, and components subject to heat loss or heat gain, circuit setters, including:
 - 1. Other items where shown on drawings and/or specified.

1.2 SUBMITTALS:

- A. Shop drawings shall be submitted on all items in accordance with the provisions of Section 23 00 10.
- B. Submit shop drawings on the following:
 - 1. Insulation
 - 2. Insulation Support Shields
 - 3. Fitting Covers
 - 4. Foam glass covers for circuit setters

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. In addition to this Section, this subcontractor shall refer to other specification sections and drawings to ascertain the extent of work, including:
 - 1. All Division 23 Sections.

1.4 DEFINITION:

- A. Work under this section of the specifications shall include but not necessarily be limited to items common to sections:
 - 1. 23 02 54 - Hot Water Piping Insulation
 - 2. 23 02 58 - Duct Insulation

1.5 QUALITY ASSURANCE:

- A. Provide piping insulation products produced by one of the following manufacturers for each type and temperature range of insulation.
 - 1. Johns-Manville
 - 2. Owens-Corning Fiberglass Corporation
 - 3. Knauff Corporation
 - 4. Armstrong Cork Company

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Product insulation against dirt, water and chemical and mechanical damage. Do not install damaged insulation; remove from project site.
- B. Delivery insulation, covering, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp, or label, affixed showing fire hazard ratings of the products.
- C. Store insulation in original wrappings and protect from weather and construction traffic.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS - PIPING INSULATION:

- A. Insulation shall have composite (insulation jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E84, NEPA 255 or UL 723 not exceeding:
 - 1. Flame Spread-25
 - 2. Smoke Developed 50
- B. Accessories such as adhesives, mastics, cements, tapes and cloth for fittings shall have the same component rating as listed above. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of water-soluble treatments is prohibited.
- C. Where Benjamin-Foster adhesives are specified equal products manufactured by 3M Company, or the manufacturer of the insulation are acceptable upon approval by the Engineer. Armstrong 520 adhesive shall be used for Armstrong insulation.
- D. In lieu of the insulation wrap specified for fittings, valves, mechanical couplings and flanges, unitary type insulation products similar to J-M Unifit shall be acceptable.
- E. In lieu of longitudinal lap seam specified, self-sealing lapped jacket shall be acceptable with requirement for aluminum bands on concealed piping. Stapling of lap seam is not acceptable.

2.2 GENERAL PRODUCT REQUIREMENTS - DUCT INSULATION:

- A. Insulation shall have a composite (insulation, jacket or facing, and adhesive) fire and smoke hazard ratings as tested by Procedure ASTM G84, NFPA 225 and/or UL 723 not exceeding:
 - 1. Flame Spread-25
 - 2. Smoke Developed-50

PART 3 - EXECUTION

3.1 GENERAL EXECUTION REQUIREMENTS - PIPING:

- A. Install insulation products in accordance with the manufacturer's written instruction, and in accordance with recognized industry practices to insure that the insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to pressure testing and acceptance of tests.
- C. Insulation shall be applied on clean dry surfaces, after inspection and release for insulation application. Items that are factory insulated shall not receive additional insulation.
- D. Insulation shall be continuous through wall and ceiling openings and sleeves.
- E. Insulation on cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal. Anchors, etc., that are secured directly to cold services shall be adequately insulated and vapor sealed to prevent condensation.
- F. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.
- G. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at Installer's option) except where specific form or type is indicated.
- H. Extend piping insulating without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
- I. Install protective metal shields and insulated inserts wherever needed to prevent compression of insulation.
- J. Pipe hanger Insulation Inserts: Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3 inch wide vapor barrier tape or band over the butt joints. For cold piping apply wet coat of vapor barrier lap cement on butt joints and seal joints with 3 inch wide vapor barrier tape or band.
- K. Where insulation is specified for piping, insulate similarly all connections, vents, drains, and any appurtenances and piping connected to system subject to heat loss or gain. Unions, couplings, or flanges provided at equipment for removal of heat exchanger, etc., shall be insulated with removable molded blocks.

- L. Where inserts occur at pipe supports and guides, provide the following:
1. On hot pipe apply 3" wide vapor barrier tape or band over the butt joints.
 2. On cold pipe apply a wet coat of vapor barrier lap cement on all butt joints and seal all joints with 3" wide vapor barrier tape or band.
- M. Fittings, valves, mechanical couplings and flanges shall be insulated with the same material and of the same thickness as the adjoining piping, except where otherwise specified.
- N. Concealed piping insulate with glass fiber insulation types shall be banded in place with three aluminum bands per section, one over each end of the joint sealing strip, and one in the middle of the section.
- O. All exposed piping, other than steam, shall be finished with (1) a PVC outer cover jacket posted to the insulation (.016" preformed) or (2) UV resistant PVC pipe and fitting cover similar to Johns Manville Zeston 300 Series PVC. Exposed fittings, etc. shall be finished with fitting cloth smoothly adhered and coated with Benjamin-Foster 30-36 and painted. Lap the cloth on itself and adjoining pipe insulation. Lap to be at least 1" on pipe insulation below 4" and 2" on sizes 4" and above.
- P. On pipe sizes 4" and larger, fittings, mechanical couplings, and valves shall be insulated with molded fitting covers. Flanges shall be insulated with sectional pipe insulation extending a minimum of 1" beyond the end of the bolts. Bolt area shall be fitted with insulating and finishing cement.
- Q. All exposed pipe shall be painted or covered in PVC jacket per color schedule in Section 23 09 70.

3.2 GENERAL EXECUTION REQUIREMENTS - DUCTWORK:

- A. Insulation shall be impaled over welded pins applied to duct surface on 12" to 18" centers. Use a minimum of two rows of fasteners on each side of duct. Secure insulation with suitable speed washers or clips firmly embedded into insulation.
- B. All joints and voids in the insulation shall be filled with insulating and finishing cement. All joints and breaks in the vapor barrier shall be sealed with 3" wide strips of the vapor barrier facing adhered with Benjamin Foster 85-20 adhesive.
- C. All standing seams and other projections shall have insulation applied so as to produce at least 1/2" cover.
- D. All fire rated insulation shall be installed strictly per manufacturer's instructions.

3.3 GENERAL EXECUTION REQUIREMENTS - EQUIPMENT:

- A. Install insulation products in accordance with the manufacturer's written instruction, and in accordance with recognized industry practices to insure that the insulation serves its intended purpose.
- B. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

- C. Insulation shall be firmly held in place with galvanized steel wire or galvanized steel bands on 12" centers.
 - D. Inspection: Installer must examine areas and conditions under which equipment insulation is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
 - E. Maintain integrity of vapor-barrier on equipment insulation and protect is to prevent puncture or other damage.
 - F. Do not apply insulation to equipment while the treatment is hot.
 - G. Apply insulation using the staggered joint method for both single and double layer construction, where feasible. Apply each layer of insulation separately.
 - H. Coat insulation surfaces with layer of insulating cement, troweled in a workmanship manner, leaving a smooth continuous surface. Fill in scored block, seams, chipped edges and depressions, and cover wire netting and joints with cement of sufficient thickness to remove surface irregularities.
 - I. Cover insulated surfaces with glass cloth jacketing neatly fitted and firmly secured. Lap seams at least two inches. Apply over vapor barrier where applicable.
 - J. Do not insulate manholes, handholes, cleanouts, ASME stamp, and manufacturer's nameplate. Provide neatly beveled edge at interruptions of insulation.
 - K. Provide removable insulation sections to cover parts of equipment which must be opened periodically for maintenance; include metal vessel covers, fasteners, flanges, frames and accessories.
- 3.4 PROTECTION AND REPLACEMENT:
- A. Replaced damaged insulation which cannot be repair satisfactorily, including units with vapor barrier damage and moisture saturated units.
 - B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

END OF SECTION 23 02 50

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SECTION 23 02 54 - HOT WATER PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Provide insulation as specified for hot water piping systems, including valves, mechanical coupling, fittings, flanges and strainers except that insulation of terminal box heating coil hook-up piping will not be required.
- B. Equipment and components subject to heat transfer including:
 - 1. Circuit setter foam glass covers
 - 2. Terminal unit heat coil
 - 3. Other items where shown on drawings or as specified.

PART 2 - PRODUCTS:

2.1 PIPING INSULATION TYPES:

- A. Type P-3 Pipe Insulation:
 - 1. Insulation shall be molded glass fiber with a maximum K factor of 0.24 at 75F mean temperature with factory applied Fire Retardant Jacket.
 - 2. For fittings and valve bodies 3" and smaller, insulation shall be one-pound density glass fiber blanket wrapped firmly under compression with No. 20 gauge galvanized annealed steel wire and given a smoothing coat of finishing cement.
 - 3. Insulation thickness schedule:

<u>Piping System</u>	<u>Thickness</u>	<u>Pipe Size</u>
Hot Water Supply and Return	1"	< 1.5"
Hot Water Supply and Return	2"	> 1.5"

2.2 EQUIPMENT INSULATION TYPES:

- A. Type E-4 Equipment Insulation:
 - 1. Insulation shall be 6# per cubic foot density glass fiber with fire retardant vapor barrier facing and having a maximum K factor of 0.24 at 75°F mean temperature.
 - 2. Sections of equipment requiring periodic servicing shall be insulated with removable ArmourCote covers as manufactured by Insulcoustic Corp. or by Sheet Metal Casing with insulation applied to the interior surface of the casing.

PART 3 - EXECUTION:

3.1 PIPING INSULATION EXECUTION:

A. Type P-4 Pipe Insulation:

1. Longitudinal lap and 4" wide vapor barrier joint seal strips shall be adhered neatly in place with BF 85-20 adhesive or approved equal and banded.
2. The ends of pipe insulation shall be sealed off with BF 30-35 coatings at all flanges, valves and fittings and at intervals of not more than 21 feet on continuous runs of pipe.

3.2 EQUIPMENT INSULATION EXECUTION:

A. Type E-5 Insulation:

1. Insulation shall be firmly held in place with galvanized steel wire or galvanized steel bands on 12" centers.
2. All joints and voids in the insulation shall be filled with insulating and finishing cement.
3. Over the insulation apply 1" galvanized wire netting secured to the bands or wires and pulled down tight. Then apply 1 coat of insulating and finishing cement troweled to a smooth finish.
4. Insulation shall be finished by applying a presized glass cloth over the insulating and finishing cement with Benjamin-Foster 85-20 adhesive.

END OF SECTION 23 02 54

SECTION 23 02 58 - DUCT INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Provide insulation as specified in section 23 02 50 and as indicated on drawings.
- B. All concealed ductwork shall be insulated with type D-1 insulation.
- C. Other items where shown on drawings or as specified.

PART 2 - PRODUCTS:

2.1 DUCT INSULATION TYPES:

- A. Type D-1 Insulation
 - 1. Duct insulation shall be flexible 1 lb. per cubic foot density glass fiber with a minimum R value of 6 at 75 deg. F. mean temperature, with reinforced foil-faced, flame resistant Kraft vapor barrier. Provide Type D-1 for all round and concealed rectangular supply and preconditioned outside air ductwork, return and exhaust air ducts in chases. Thickness 2". Flexible duct runouts in supply air systems shall be furnished with factory installed insulation.

PART 3 - EXECUTION:

3.1 DUCT INSULATION:

- A. Type D-1 Insulation:
 - 1. Insulation shall be impaled over welded pins applied to duct surface on 12" to 18" centers. Use a minimum of two rows of fasteners on each side of duct. Secure insulation with suitable speed washers or clips firmly embedded into insulation. All joints and voids in the insulation shall be filled with Insulating and Finishing Cement. All joints and breaks in the vapor barrier shall be sealed with 3" wide strips of the vapor barrier facing adhered with Benjamin-Foster 85-20 adhesive.

END OF SECTION 23 02 58

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SECTION 23 07 50 – COILS

PART 1 - GENERAL

1.1 SCOPE:

- A. This work consists of providing all labor, materials, equipment, and services necessary for the proper installation of coils for the heating and cooling system as indicated on the construction documents.
- B. Coils shall be manufactured by CES, Trane, Carrier, JCI or McQuay with ratings in accordance with ARI 140.

PART 2 - PRODUCTS:

2.1 HOT WATER COILS:

- A. Hot water coils shall be serpentine type with continuous circuits from inlet header to outlet header.
- B. Fins shall be aluminum or copper soldered or mechanically fastened to copper tubes. Tubes shall be mechanically expanded and sealed to die formed welded steel headers by tin-lead coating.
- C. Tube bundles shall be enclosed in zinc-coated casing designed for attaching to unit casings. Coils shall be designed for 200# liquid working pressure and air tested under water at 400#.

PART 3 - EXECUTION:

3.1 ALL COILS:

- A. Install coils as indicated, and in accordance with manufacturer's installation instructions.
- B. Mount coils on steel supports to form banks or stacks as indicated, brace, secure to air intake chamber. Place in location to permit installation of bypass damper if required, provide steel baffles where required to prevent bypassing of air.
- C. Pitch coil casings for drainage, not less than 1/8" toward return connections, except where drainage feature is included in coil design.
- D. Provide for each bank of cooling coils, stainless steel drain pan under each coil supported off of floor of sufficient height to allow installation of condensate trap to allow drainage of condensate from pan when installed on suction side of fan.
- E. Provide for each hot or chilled water coil unit, water supply, return connection, strainer, gate valves, automatic temperature regulating valve, balancing cocks, as indicated.

END OF SECTION 23 07 50

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SECTION 23 08 00 - AIR DISTRIBUTION

PART 1 - GENERAL

1.1 DEFINITION:

- A. Work under this section of the specifications shall include but not necessarily be limited to items common to sections:

- | | | |
|----|----------|--------------------------|
| 1. | 23 08 40 | Ductwork |
| 2. | 23 08 50 | Air Terminal Units |
| 3. | 23 08 60 | Duct Accessories |
| 4. | 23 08 70 | Air Distribution Devices |

- B. In all cases, work specified in this section of the specification shall be compatible with all other specification sections.

1.2 SUBMITTALS:

- A. Shop drawings and wiring diagrams shall be submitted on all items in accordance with the provisions of specification Section 23 00 10.

1.3 COORDINATION:

- A. This HVAC contractor shall coordinate with the other contractors as required to produce workable, controllable systems. Generally, all controls and equipment shall be furnished and installed by this contractor unless otherwise noted.

END OF SECTION 23 08 00

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SECTION 23 08 40 – DUCTWORK

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This work consists of providing all labor, materials, equipment, and services necessary for the installation of all sheet metal work and related equipment and accessories as indicated on the drawings, required and/or as specified.
- B. All outdoor air ductwork, all supply air ductwork between air handling units and variable air volume units shall be of medium pressure construction.

1.2 STANDARDS:

- A. All ductwork installation including hangers, supports, access doors, etc. shall be in accordance with the latest recommendations of the ASHRAE Guide, the SMACNA Medium Pressure Duct Construction Standards, SMACNA Low Pressure Duct Construction Standards, and with details on the drawings.

1.3 QUALITY ASSURANCE

- A. Welding Standards: Qualify welding procedures and welding personnel to perform welding processes for this Project according to AWS D1.1, "Structural Welding Code – Steel" for hangers and supports; AWS D1.2, "Structural Welding Code – Aluminum" for aluminum supporting members; and AWS D9.1, "Sheet Metal Welding Code" or duct joint and seam welding.
- B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems" unless otherwise indicated.
- C. Comply with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems" unless otherwise indicated.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver sealant and firestopping materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.
- B. Store and handle sealant and firestopping materials according to manufacturer's written recommendations.
- C. Deliver and store stainless steel sheets with mill-applied adhesive protective paper maintained through fabrication and installation.

1.5 QUALIFICATION OF MEDIUM PRESSURE DUCT SUPPLIER:

- A. The round medium pressure ductwork and fittings, as shown on the plans, shall be manufactured by a company who has had as its principal business the manufacture of medium pressure duct and fittings for at least three years.
- B. This HVAC Contractor shall submit with his proposed list of equipment manufacturers the name of the manufacturer of the medium pressure ductwork.

1.6 GENERAL REQUIREMENTS:

- A. Provide all metal ductwork as indicated on the drawings. Ducts, unless otherwise specified shall be constructed entirely of galvanized steel sheets.
- B. All sheet metal work shall be performed by trained mechanics, experienced in this type of work and shall be installed in a neat workmanlike and substantial manner.
- C. All duct joints sealing compounds, glues, mastics, and adhesives used on duct construction shall be "Fire Safe" and be "U.L." approved and labeled.
- D. In all cases where duct sleeves are roughed through walls, floors, or ceilings, they shall be blocked and braced to prevent sagging or crushing occurring during construction. Ducts passing through floors of above ground equipment rooms shall have 4" high concrete curbs and flashing to prevent leaking to water around duct openings. Duct openings through exposed wall of equipment room shall be fitted with sheet metal collars to make a neat closure between opening and sleeve.
- E. The general location of ducts shall be as shown. Exact location of ductwork into proper relation with other equipment features of the building.
- F. Material shall be prime galvanized sheet steel free from blisters or other mechanical defects.
- G. Shop-fabricate ductwork in 4, 8, 10 or 12-foot lengths, unless otherwise indicated or required to complete runs. Pre-assemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for re-assembly and coordinated installation.

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS:

- A. Exposed ductwork materials: Where ductwork is indicated to be exposed to view in occupied spaces, vertical chases and equipment rooms, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, oil canning, stains and discolorations, and other imperfections, including those which would impair painting.
- B. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ANSI/ASTM A 527, lock forming quality, with ANSI/ASTM A 525, G90 zinc coating; mill phosphatized for exposed locations.

- C. Protect finished surfaces with mill-applied adhesive protection paper, maintained through spaces.
- D. Stainless Ductwork: Unless noted otherwise on the drawings, stainless steel ductwork shall be Type 304 steel sheet per ASTM A167 with a finished surfaced No. 4 for exposed locations, and No. 2B for concealed locations. When 'Welded Duct' is called out on the drawings, ducts shall have longitudinally welded seams and welded or flanged joints and connections to equipment or accessories.
- E. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- F. Tie-Rods: Galvanized steel, ¼-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 LOW PRESSURE DUCTWORK:

- A. Ductwork shall be designed for velocities not exceeding 2000 FPM or total static pressures not exceeding 2 inches.
- B. Sheet metal gauges, cross joints and reinforcing shall be as indicated on Table 1 of SMACNA.
- C. The Pittsburg lock shall be used for longitudinal seams and shall conform to Plate No. 5A of SMACNA.
- D. Elbows shall be square with double thickness turning vanes and shall conform to Plate No. 22 of SMACNA or radius where shown.
- E. Tapers and offsets shall conform to Plate No. 23 of SMACNA.
- F. Where changes are made in shape of ducts full areas shall be maintained and changes shall be gradual to minimize pressure drop.
- G. Ducts terminating at grilles and registers shall be provided with suitable means of attachment.
- H. Air cushions shall be provided beyond the last take off on a duct run at least equal to the depth of the duct at that point.
- I. Obstructions in ductwork shall be streamlined and shall conform to Plate no. 24 of SMACNA.
- J. Branch round ducts should enter main using spin-in steel fittings with balancing damper by Genflex.

2.3 MEDIUM PRESSURE DUCTWORK:

- A. Ductwork shall be designed for velocities in excess of 2000 FPM and static pressure from 2" W.G. static pressure to 6" W.G. static pressure not to exceed 6" W.G. static pressure. All supply ductwork from AC units to VAV units and supply and exhaust duct from PCU units to VAV units shall be medium pressure construction.

- B. This HVAC contractor shall not provide additional bends, takeoffs, offsets or changes in shape without prior approval of engineer.
- C. Air cushions shall be provided beyond the last takeoff on a duct run at least equal to the depth of the duct at that point.
- D. Zinc coatings burnt off of steel during welding, shall be painted to prevent corrosion at the weld.

2.4 RECTANGULAR MEDIUM PRESSURE DUCTWORK:

- A. Sheet metal gauges, cross joints, and reinforcing shall be as indicated on Figure 3-1 of SMACNA.
- B. Joints selected shall be constructed in accordance with figures 3-4 thru 3-15. Sealant shall be applied at all joints.
- C. The rods shall be fastened in accordance with Figures 3-18 and 3-20 of SMACNA.
- D. Fasteners shall be in accordance with Figure 3-19 of SMACNA.
- E. Radiused elbows shall be provided with splitters and shall be in accordance with Figures 3-21 and 3-22 of SMACNA.
- F. Square throat elbows with turning vanes shall be in accordance with Figure 3-23 of SMACNA.
- G. Transformations shall be full area type in accordance with Figures 3-24 thru 3-27 of SMACNA.
- H. Branch connection shall be in accordance with Figure 3-28 of SMACNA.
- I. Obstructions in ductwork shall not be allowed.

2.5 FLEXIBLE DUCTWORK:

- A. Insulated flexible duct shall be rated to 10" working pressure. The liner shall be encapsulating a spring steel helix. The liner shall completely shield the nominal 1" x 1 lb. per cu. ft. fiberglass insulation from the air stream. A tough seamless non-vinyl exterior vapor barrier jacket shall complete the assembly. Flexible ducts shall be in compliance with the provisions of UL-181 Class 1 Air Duct Material.
- B. Ductwork shall be a maximum of 6'-0" long and shall be provided with a flame resistant PVC vapor barrier and 1" thick, 3/4" density fiberglass insulation.
- C. Ductwork must comply with NFPA Bulletin 90A and be listed as a Class I connector per UL Standard 181.

2.6 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

1. Joint and Seam Tape: 2 inches wide; glass-fiber fabric reinforced.
2. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with tape to form a hard, durable, airtight seal.
3. Joint and Seam Sealant: One part, non-sag, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids.
4. Flanged Joint Mastics: One part acid-curing, silicone, elastomeric joint sealants, complying with ASTM C920, Type S, Grade NS, Class 25, Use O.

2.7 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for building materials.
 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4-inches thick.
 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4-inches thick.
- B. Hanger Materials: Galvanized, sheet metal or round, threaded steel rod
 1. Electro-galvanized, all thread rod or galvanized rods with threads painted after installation.
 2. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports; Steel shapes complying with ASTM A 36/A 36M.
 1. Supports for Galvanized Steel Ducts: Galvanized steel shapes and plates.
 2. Supports for Stainless Steel Ducts: Stainless steel support materials

PART 3 - EXECUTION

3.1 INSTALLATION OF DUCTWORK - GENERAL:

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (3% leakage low pressure, 2% leakage medium pressure duct) and noiseless (no objectionable noise) systems, capable for performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.
- B. Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations

or, if not otherwise indicated, run ductwork in shortest route which does not obstruct unusable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building. Limit clearances to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work. Do not locate ductwork over (parallel to) partition indicated to extend to deck.

- C. Electrical Equipment Spaces: Do not run ductwork through transformer vaults and their electrical equipment spaces and enclosures.
- D. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus-insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2".
- E. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- F. Support ductwork in manner complying with SMACNA "Low Pressure Duct Standards - 5th Edition" hangers and supports section.
- G. Slope all fume hood make-up air ductwork at 1/16" per foot to low point drains.
- H. Slope all fume hood exhaust air ductwork at 1/16" per foot to low point drains.

3.2 RECTANGULAR DUCT FABRICATION

- A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA's HVAC Duct Construction Standards – Metal and Flexible". Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications and joint types and intervals.
 - 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
 - 2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains and discolorations.
- B. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:
 - 1. Supply Ducts: 3-inch wg
 - 2. Outdoor Air Ducts: 3-in wg
 - 3. Return Ducts: 2-inch wg, negative pressure.
 - 4. Exhaust Ducts: 2-inch wg, negative pressure.
- C. Cross breaking or cross beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inches thick or less, with more than 10 SF of unbraced panel area unless ducts are lined.

3.3 DUCT HANGERS AND SUPPORTS:

- A. Hangers and supports shall conform to the latest edition of SMACNA Standards Plates 16, 17, 18 and 19.
- B. Hangers and supports for ductwork shall not support any other devices unless approved in writing by Engineer.
- C. Hanger sizes for rectangular duct shall be as follows for 6 foot spacing.

<u>Longest Dimension of Duct</u>	<u>Round Hangers</u>	<u>Strap Hangers</u>	<u>Trapeze Shelf Angles</u>
Up thru 18"	1/4" Rod	1"x16 Ga	1"x1"x1/8"
19" thru 30"	3/8" Rod	1"x16 Ga	1"x1"x1/8"
31" thru 42"		1"x16 Ga	1 1/2"x1 1/2" x1/8"
43" thru 84"		1"x16 Ga	1 1/2"x1 1/2" x1/8"

- D. All ductwork shall be properly secured directly to the structure of the building using suitable strap or angle hangers.
- E. Risers within duct shaft shall be supported every 8 feet by angleclips.

3.4 DUCT CONSTRUCTION FOR LOW VELOCITY DUCTS:

- A. All joints in supply duct work shall be sealed with an approved type duct sealing tape or sealing compound. Where pressure sensitive tape is used for sealing duct joints use an approved type tape sealer in addition to the adhesive on the tape. Joint sealer to be U.L. labeled and fire safe.
- B. Changes in shape and dimension shall conform to the following:
 1. For increases in cross-sectional area, the shape of the transformation shall not exceed 1" in 7".
 2. For reductions in area, the slope may be 1" in 4", but 1" in 7" is preferred.
 3. All changes in direction shall either be with a radius not less than 1/2 width of the duct, or square elbow (both) with turning vanes.

3.5 DUCT CONSTRUCTION FOR MEDIUM PRESSURE RECTANGULAR DUCTWORK:

- A. All medium pressure ducts must have all seams, joints and connections with sealing compound of an approved type. Sealing compound to be liquid sealer or bead type sealer as required to meet the special conditions. All duct sealing compound of an approved type. Sealing compound to be liquid sealer or bead type sealer as required to meet the special conditions. All duct sealing compound must be fire safe and labeled.
- B. Shop procedure for sealing ducts shall be as follows:
 1. Before fittings and joints are assembled, duct sealer shall be applied to rivets, grooved seams and tap-off collars. On the internal side of the metal, Pittsburgh lock, pocket shall be flooded with sealing compound using pump type oil can, and the duct assembled.
 2. Duct sealer of an approved type shall be brushed around reinforcing rod washers, corners, rivets, notches and tap-off collars after duct is assembled. A double "S" slip or

other approved type connectors shall be installed on the air leaving side of the duct and fastened in-place, using meal screws on 6 inch centers. Sealing compound shall be brushed into connecting lap and corner joints and all seams of "S" slip or approved type connector.

3. Coat inside of connecting lap of "S" slip and duct surface with sealing compound. Where possible sealing should be done on inside of the ductwork.

C. Field procedure for sealing joints shall be as follows:

1. Sealing compound shall be spread on the inside of the double "S" slip or connector and the joints of duct assembled. Immediately after joints are assembled, holes will be drilled through the "S" slip and metal screws inserted on 6 inch centers. Sealer shall be applied over the screw head.
2. After 24 hours, second coat of sealing compound shall be spread over the joints and allowed to dry for 24 hours before testing.
3. Where joints are not accessible for proper sealing, hand holes should be cut in the duct and the joints sealed from the inside. Special care shall be taken to seal off duct corner.
4. When testing ducts for leaks, leaks should be marked and sealed without pressure, using sealing compound and allowed to dry for 24 hours.
5. All branch take-offs taps to terminal units shall be conical fitting or as indicated on drawings. All perpendicular take-offs shall be made the bell-mouth tappings or fittings.
6. All square bends and elbows with a center line radius of turn less than 1-1/2 by the width of the duct shall be provided with "formed" turning vanes. These vanes shall be made of 20 gauge galvanized metal up to 18 inches in length and 18 gauge for over 18 inches length. Vanes shall be spaced on approximately 3 inch center. Vanes shall have "Runners" attached where shown on plans.

3.6 FLEXIBLE DUCTWORK:

- A. The installation shall conform to the techniques shown in the UL approved and factory supplied instructions specified for the product. Submittals will include product data sheets as well as approved installation instructions. Care is to be taken that all run-outs of flexible duct are installed as straight as practical and fastened so as to eliminate leakage and vibration.
- B. Peel back jacket and insulation at end of flexible duct. Fit duct over collar or sleeve and clamps and seal as described for uninsulated flexible duct. Pull jacket and insulation back in place and secure with two wraps of duct tape.
- C. Secure flexible duct to collar or sleeve with 1/2 inch wide aluminum, galvanized steel or stainless steel bands or clamps and matching seals. Clamping device shall be two inches back from end of flexible duct. Seal with two wraps of duct tape Polyhen #222, Arno #C-520 or Nashua No. 357.

3.7 SEAM AND JOINT SEALING

- A. General: Seal duct seams and joints according to the duct pressure class indicated and as described in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible".
- B. Pressure Classification Less than 2-Inch wg: Transverse joints
- C. Seal externally insulated ducts before insulation installation.

3.8 HANGING AND SUPPORTING

- A. Install rigid round, rectangular, and flat-oval metal duct with support systems indicated in SMACAS's "HVAC Duct Construction Standards – Metal and Flexible".
- B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.
- C. Support vertical ducts at a maximum interval of 16 feet and at each floor.
- D. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.9 CONNECTIONS

- A. Connect equipment with flexible connectors according to Division 23 "Duct Accessories".
- B. For branch, outlet and inlet, and terminal unit connections, comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible".

3.10 FIELD QUALITY CONTROL

- A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.
- B. Conduct tests in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing
- C. Determine leakage from entire system or section of system by relating leakage to surface area of test section.
- D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (for both positive and negative pressures), and Leakage Classification 6 for pressure classifications from 2 to 10 inch wg.
- E. Remake leaking joints and retest until leakage is less than maximum allowable.
- F. Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual".

3.11 ADJUSTING

- A. Adjust volume-control dampers in ducts, outlets, and inlets to achieve design airflow.
- B. Refer to Division 23 Section "Testing, Adjusting and Balancing" for detailed procedures.

3.12 MATERIAL SCHEDULE

- A. General supply, return and exhaust systems: Galvanized Steel

3.13 CLEANING AND PROTECTION:

- A. After completing system installation, including outlet fittings and devices, inspect the system. Vacuum ducts before final acceptance to remove dust and debris. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Strip protective paper from stainless steel ductwork surfaces, and repair finish wherever it has been damaged.
- B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

END OF SECTION 23 08 40

SECTION 23 08 50 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work consists of providing all labor, materials, equipment, and services necessary for the installation of terminal units for the heating, cooling, and ventilation systems as indicated on the drawings, required, and as specified. Provide submittals for air terminal units per specification section 23 00 10.

PART 2 - PRODUCTS

2.1 VARIABLE AIR VOLUME REHEAT TERMINAL:

- A. The variable volume unit shall be throttling type and suitable for low and medium pressure systems as required. The room sensor shall modulate the control valve in the unit to vary the air flow to satisfy the room's heating and/or cooling requirement. The valve operator shall be an electric type. The control valve shall be specifically designed to provide a linear control characteristic throughout its operating range. Control shall be proportional to the actuator movement regardless of the valve opening. The valve shall seal against gasketed stop for minimum leakage. Total leakage of casing and valve shall not exceed 3% at 3" inlet static pressure. The control unit shall be inlet duct pressure independent and shall be able to deliver desired CFM with inlet pressure variation up to 4 inch W.G. The box shall have differential pressure taps to allow readout of air quantity being delivered.
- B. The control unit shall be factory set for minimum and maximum air quantity. Provide external means for limiting maximum and minimum flow for field adjustment. The control valve shall be normally open. Factory air flow test each unit and set CFM to within 5% of design CFM.
- C. Casing: The unit casing shall be constructed of minimum 22 gage hot dipped galvanized steel. The unit shall be factory insulated with 1 inch thick minimum closed-cell, thermal and acoustical insulation without any exposed or raw edges. The surface of the insulation shall be treated to prevent erosion and shall conform to UL Test 181. The insulation must be UL approved and shall comply with NBFU and NFPA 90A requirements.
- D. Noise: Maximum total static pressure available at the box inlet is as scheduled in the drawing. The total static pressure includes the pressure drop through the duct at the discharge side of the box, flexible connection to the air supply boots or supply diffuser and the supply diffuser and/or supply air boots. Maximum noise level in the room shall be NC 25 with maximum 8db room absorption and minimum 5 ft. lined duct at the discharge of the terminal unit. The HVAC Contractor shall make and coordinate all necessary changes resulting from the use of terminals other than those used for the base design.
- E. The Temperature Control Contractor shall provide the DDC controller with transformer and disconnect and the terminal unit manufacturer shall install the operator on the unit with all necessary linkage in accordance with box requirements. The controller shall be pivoted to protect against side forces throughout the full stroke.
- F. Make shall be Nailor, Titus, Trane, Price or approved equal.

2.2 CONSTANT AIR VOLUME REHEAT TERMINAL:

- A. The constant volume unit shall be suitable for low and medium pressure systems as required. Constant air flow to the room shall be maintained during occupied hours independent of upstream static pressure. The valve operator shall be an electric type. Control shall be proportional to the actuator movement regardless of the valve opening. Total leakage of casing and valve shall not exceed 3% at 3" inlet static pressure. The control unit shall be inlet duct pressure independent and shall be able to deliver desired CFM with inlet pressure variation up to 4 inch W.G. The box shall have differential pressure taps to allow readout of air quantity being delivered.
- B. The control unit shall be factory set for minimum and maximum air quantity. Provide external means for limiting maximum and minimum flow for field adjustment. The control valve shall be normally open. Factory air flow test each unit and set CFM to within 5% of design CFM.
- C. Casing: The unit casing shall be constructed of minimum 22 gage hot dipped galvanized steel. The unit shall be factory insulated with 1 inch thick minimum closed-cell, thermal and acoustical insulation without any exposed or raw edges. The surface of the insulation shall be treated to prevent erosion and shall conform to UL Test 181. The insulation must be UL approved and shall comply with NBFU and NFPA 90A requirements.
- D. Noise: Maximum total static pressure available at the box inlet is as scheduled in the drawing. The total static pressure includes the pressure drop through the duct at the discharge side of the box, flexible connection to the air supply boots or supply diffuser and the supply diffuser and/or supply air boots. Maximum noise level in the room shall be NC 25 with maximum 8db room absorption and minimum 5 ft. lined duct at the discharge of the terminal unit. The HVAC Contractor shall make and coordinate all necessary changes resulting from the use of terminals other than those used for the base design.
- E. The Temperature Control Contractor shall provide the DDC controller with transformer and disconnect and the terminal unit manufacturer shall install the operator on the unit with all necessary linkage in accordance with box requirements. The controller shall be pivoted to protect against side forces throughout the full stroke.
- F. Make shall be Nailor, Titus, Trane, Price or approved equal.

PART 3 - EXECUTION:

3.1 GENERAL:

- A. All terminal units shall be installed in strict accordance with the manufacturer's recommendation.
- B. Care shall be taken in the storage and erection of these terminal units that they are protected from dirt and other construction debris. The protective inlet and discharge covers shall be kept on the units until ductwork is actually connected.
- C. Install air terminal units in a horizontal position per manufacturer's installation instructions and recommendations.
- D. Coordinate connection of all electrical wiring and low voltage wiring to air terminal units as required.

- E. Locate each unit so that access panels, hot water reheat coils and its associated valves and any other moving operator are accessible for removal and/or maintenance. Provide a minimum of 18 inches clearance from the side of the device to the nearest obstruction for this purpose.
- F. Install unit as close as possible to ceiling for ease of access and maintenance.

END OF SECTION 23 08 50

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SECTION 23 08 60 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This work consists of furnishing all labor, materials, equipment, and services necessary for the installation of all supply, return, ventilation, and exhaust ductwork accessories and related equipment and accessories as indicated on the drawings, required, and as specified. Provide shop drawings for fire dampers, combination fire/smoke dampers and air monitor stations.

PART 2 - PRODUCTS

2.1 INSTRUMENT TEST HOLES:

- A. Provide test holes Ventlok 699-2 or approved equal complete with gasket and heavy screw cap.

2.2 MANUAL DAMPERS:

- A. Volume dampers shall be manually operated, single or multi-blade type with sleeve bearings, galvanized steel interlocking blades and a galvanized steel frame. In ducts over 12 inches deep use multiple opposed blade type, gang operated dampers with a maximum blade width of 8 inches. Fabricate damper blades of 16 gauge steel with hemmed edges, and a maximum length of 48 inches. Damper operating rod shall be full blade length extended through the duct to externally mounted bearing plates. All insulated ductwork bearing plates shall be flush with insulation finish and fastened to the duct; operating lever shall be of the indicating type with locking quadrant.
- B. Furnish and install, where indicated on the drawings or where required, air splitter dampers and/or butterfly dampers with indicating and locking quadrants or push rods and pillow blocks. The dampers shall be two gauges heavier than the ducts in which they are installed. Damper blades shall be riveted to the supporting rod. Splitter dampers shall be sufficiently long to extend the full width of the branch duct to which attached. Where necessary they shall be curved to scoop branch duct air out of the main duct air stream.
- C. Splitter dampers shall also be designed to conform to Figure A of Plate No. 28 of the SMACNA Low Velocity Duct Construction Standards.
- D. Dampers up to 48" x 12" shall be single blade designed to conform to Figures B, C and D, Plate No. 28 of the SMACNA Low Velocity Duct Construction Standards.
- E. Dampers with blade lengths over 48" shall be made in multiple sections with mullions between the sections of blades.
- F. Dampers in duct over 12" height shall be multibladed and designed to conform to Figures B and C of Plate No. 29 of the SMACNA Low Velocity Duct Construction standards.

2.3 REMOTE OPERATED VOLUME CONTROL DAMPERS:

- A. Provide Young's regulator for balancing of volume damper in space with dry wall ceiling.

2.4 TURNING VANES:

- A. All square elbows shall be provided with airfoil shaped double wall turning vanes for noise and directional control.
- B. Vanes shall be installed in accordance with Plate No. 22 of the SMACNA Low Velocity Duct Construction standards.
- C. Vane runners shall be screwed to the vanes; runner assembly shall be spot welded, riveted or screwed to duct sides.

PART 3 - EXECUTION:

3.1 INSTRUMENT TEST HOLES:

- A. Test holes shall be provided at the following locations:
 - 1. Each discharge duct from the duct heating coils.
 - 2. Each discharge duct from air terminal device.

3.2 MANUAL DAMPERS:

- A. Dampers in exposed ductwork or ductwork accessible from lay-in tile ceilings shall be controlled with quadrants mount on duct walls.
- B. Dampers in concealed ductwork or ductwork not accessible due to plaster ceilings, concealed spline ceilings, etc., shall be provided with an extension and quadrant handle in ceiling enclosed in a box with an enameled cover plate.
- C. Volume dampers shall be located where shown on drawings and as required by the balancing sub-contractor.

3.3 TURNING VANES:

- A. Vanes shall be installed in accordance with SMACNA Low Velocity Duct Construction standards.
- B. Vane runners shall be screwed to the vanes, runner assembly shall be spot welded, riveted or screwed to duct sides.

END OF SECTION 23 08 60

SECTION 23 08 70 - AIR DISTRIBUTION DEVICES

PART 1 - GENERAL

1.1 GENERAL

- A. This work consists of furnishing all labor, materials, equipment and services necessary for the installation of air distribution devices for the heating, cooling, and ventilation systems as indicated on the drawings, required, and as specified.

PART 2 - PRODUCTS

2.1 LINEAR SLOT DIFFUSERS:

- A. Provide where shown on the drawings all metal linear slot diffusers of the sizes and capacities indicated. Units shall be adaptable for use with ceilings as indicated on the architectural finish schedule.
- B. All linear slot diffuser shall be heavy duty extruded aluminum with either aluminum or corrosion resistant steel pattern controllers.
- C. Linear slot diffusers shall be selected to diffuse the air uniformly throughout the occupied space. The sound power level of air distribution equipment devices shall not exceed NC25 unless otherwise noted.
- D. In all cases, a schedule linear slot diffusers shall be prepared and submitted to the Architect and Engineers for approval of size and design of outlets before they are ordered for installation.
- E. All linear slot diffusers of sizes indicated or required, or equivalent areas as approved, shall be furnished and installed where shown on the drawings, or as required.
- F. Each linear slot diffuser shall have the required capacity and shall be guaranteed to give the required draft with draftless diffusion. Where manufacturer's recommendations require duct sizes differing from those on the drawings, the same shall be provided at no additional cost to the Owner.
- G. Equipment manufacturer shall submit engineering data in a manner to facilitate convenience review of the following factors.
 - 1. Throw and drop of each unit, noise criteria ratings for each unit, sizes, free area and quality of construction.
 - 2. All air distribution equipment shall be as manufactured by by Nailor, Titus, Price, Carnes, Metalaire or approved equivalent.

2.2 CEILING DIFFUSERS:

- A. Provide where shown on the drawings all metal diffusers of the sizes and capacities indicated. Units shall be acceptable for use with ceilings as indicated on the architectural finish schedule.
- B. Ceiling diffusers shall be selected to diffuse the air uniformly throughout the occupied space. The sound power level of air distribution equipment devices shall not exceed NC25 unless otherwise noted.
- C. Equipment manufacturer shall submit engineering data in a manner to facilitate convenient review of the following factors:
 - 1. All diffusers located in kitchen, showers, wash areas and other damp locations shall be constructed entirely of aluminum.
 - 2. All air distribution equipment shall be as manufactured by Nailor, Titus, Price, Carnes, Metalaire or approved equivalent.
 - 3. Diffusers shall be located to provide a symmetrical pattern with ceiling tile, light fixtures and other ceiling elements. All locations shall be verified by the Architect.
 - 4. All diffusers shall be factory coated with baked enamel finish of color to be selected by Architect.
 - 5. Each air supply outlet shall have the required capacity, and shall be guaranteed to give the required draft with draftless diffusion. Where manufacturer's recommendations require duct sizes differing from those on the drawings, the same shall be provided at no additional cost to the owner.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install all equipment and appurtenances in strict accordance with approved shop drawings and manufacturer's recommendations.

END OF SECTION 23 08 70

SECTION 23 09 55 - ROUGH-IN CONNECTIONS TO EXISTING DUCTWORK AND PIPING

PART 1 - GENERAL:

1.1 SCOPE OF WORK:

- A. Make final connections to those items for those existing ductwork and/or piping connections except where specifically designated on the drawings or in these specifications otherwise.

1.2 FIELD VERIFICATION:

- A. The mechanical contractor shall field verify all tie-in points and sizes at least two weeks prior to work and in enough time to obtain the information needed of his work.

1.3 ROUGH-IN DRAWINGS:

- A. The mechanical contractor shall secure from each contractor furnishing items of equipment (requiring mechanical connections) roughing-in prints and complete detail shop drawings of all equipment, and review at the job each area with the respective contractor before roughing-in. Make all adjustments as required. In the event that the mechanical contractor fails to obtain the roughing-in prints for whatever reason, and roughs in his work at the wrong location, the relocation as required at the expense of the mechanical contractor. In the event that the mechanical contractor rough-ins in accordance with prints furnished by the respective contractor, and it turns out that the pipes are in the wrong locations, any costs of relocating the rough-ins will be paid by the rough-in contractor furnishing that item of equipment.

PART 2 - PRODUCTS:

2.1 GENERAL

- A. Materials shall be the same as are described in the specifications for the various systems.

END OF SECTION 23 09 55

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SECTION 23 09 70 - MECHANICAL IDENTIFICATION AND PAINTING

PART 1 - GENERAL

1.1 SCOPE:

- A. All exposed pipe, hangers, and equipment installed by HVAC contractor shall be painted unless it has a factory finish or is noted otherwise. Exposed chromeplated brass, stainless steel, or plastic piping will not be painted.
- B. Type of identification devices specified in this section include the following:
 - 1. Plastic Pipe Markers
 - 2. Plastic Tape
 - 3. Valve Tags
 - 4. Valve Schedule Frames
 - 5. Engraved Plastic-Laminate Signs

1.2 QUALITY ASSURANCE:

- A. Manufacturers: Firms regularly engaged in manufacturer of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.3 SUBMITTALS:

- A. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8½" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags," in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 01.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE MARKERS:

- A. Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color-coded, plastic-sheet pipe markers, complying with ANSI A13.1.
- B. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
 - 1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 - 2. Adhesive lap joint in pipe marker overlap.
 - 3. Laminated or bonded application of pipe marker to pipe (or insulation).
 - 4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1 1/2".
- C. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
 - 1. Laminated or bonded application of pipe marker to pipe (or insulation).
 - 2. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1 1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
 - 3. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.
- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
- E. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.2 PLASTIC TAPE:

- A. Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.
- B. Width: Provide 1 1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2 1/2" wide tape for larger pipes.
- C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.3 ROOM TEMPERATURE SENSOR TAGS:

- A. For room temperature sensors that control more than one space, provide laminated, engraved name tag that designates the space room numbers (to be provided by the University 30 days prior to occupancy) that the controller serves.

2.4 ABOVE CEILING EQUIPMENT IDENTIFICATION TAGS:

- A. For manual and automatic valves located above lay-in ceilings provide a 0.50" diameter "blue" plastic tab securely and neatly attached to the ceiling tile below valve. For hard ceilings, attach tag to access door.
- B. For all terminal units located above lay-in ceilings provide a 0.50" diameter "green" plastic tab securely and neatly attached to the ceiling tile below. For hard ceilings attach tag to access door.
- C. For all fire dampers and/or combination dampers, provide a 0.50" diameter "red" plastic tab securely and neatly attached to the ceiling tile below. For hard ceilings attach tag to access door.

2.5 VALVE TAGS:

- A. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1 1/2" diameter tags, except as otherwise indicated.
- B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

2.6 VALVE SCHEDULE FRAMES:

- A. For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on walls. Provide frames of rigid plastic or metal, with plastic glazing.

2.7 ENGRAVED PLASTIC-LAMINATE SIGNS:

- A. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.8 LETTERING AND GRAPHICS:

- A. Coordinate names, abbreviations and other designations used in mechanical identification work with corresponding designations shown pre-existing, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Terminal Unit VAV 1-1, etc.).

2.9 PAINT:

- A. All products shall be in accordance with the specifications for painting in the general contract.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Any equipment shipped with a factory applied finish shall be touched up to repair any damage to the finish so that it is the same as new.
- B. In the mechanical equipment rooms the HVAC contractor shall be responsible for painting all piping, equipment, and accessories installed under his contract.
- C. In other parts of the buildings items which are in place in finished areas when general building painting is done will be painted by the General Contractor. Items installed after painting is completed shall be painted by the HVAC contractor, as directed by the architect.
- D. All exposed nongalvanized ferrous metal hangers and miscellaneous metal used in connection with the HVAC systems shall be painted with two coats of enamel.
- E. All exposed piping including insulated piping, insulated by HVAC contractor shall be painted two coats of oil paint. Elastomeric pipe insulation shall have two coats of enamel of the type recommended by the insulation manufacturer.
- F. Do not field paint exposed copper pipe, brass valves, or brass trim on iron body valves, or machinery or equipment that has a factory applied finish unless otherwise specified. Do not paint plastic pipe.
- G. All paint shall be delivered to the project in unbroken containers. Containers shall be labeled to indicate color, directions for use, manufacture, and date of manufacturer. Directions for use of the paint shall be carefully followed in the mixing and general application. All paint shall be applied under dry and dust free conditions. Sufficient time shall elapse between paint coats to permit satisfactory recoating. Once started all painting shall be completed without delay.

3.2 DUCTWORK IDENTIFICATION:

- A. Identify air supply, return, exhaust, pre-conditioned outside air (PCOA), kitchen hood exhaust and dishwasher exhaust ductwork with plastic signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).
- B. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacing along exposed runs.
- C. Access Doors: Provide plastic-laminate type signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety in procedural information.
- D. Concealed Doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags must be installed for identification.

3.3 PIPING SYSTEM IDENTIFICATION:

- A. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), exterior non-concealed locations and above removable acoustical ceilings.
 - 1. Near each valve and control device.
 - 2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - 4. At access doors and access points which permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
 - 7. On piping above removable acoustical ceilings.

3.4 PAINT SCHEDULE:

- A. All exposed equipment, pipes, conduits, or other appurtenances shall be painted by this contractor with materials and application as specified in the general contract specifications and as directed by the architect.
- B. All concealed pipe covering shall be identified by colored bands and legends. The direction of flow shall be indicated by flow arrows.
- C. All exposed pipe covering shall be totally painted the color of the band color listed below. All exposed pipe hangers, rods, supports, channels, etc. shall be painted flat black.
- D. Directions arrow and fluid name shall be applied by sticker at same spacing as above. The stickers shall be secured by color coded tape wrapped two times around the pipe at each end of the label or spring cords.

3.5 PIPE AND DUCT IDENTIFICATION:

- A. Note: For pipe systems not listed, similar approach shall be provided as part of this contract. Color and identification shall be provided at a later date.
- B. Piping systems in mechanical rooms shall be completely painted with the applicable colors listed below and have appropriate self-sticking or strap-on identifications and arrows indicating direction of flow. Piping and ducts in chases above ceiling, etc. should be color banded and have stencil markings at appropriate intervals. On straight runs of piping, markings should be no further than 30 feet apart; and stencil identifications, color bands, and direction arrows should be near each valve, pressure reducing valve, heat exchanger, etc. Where pipe passes through walls or floor, marking should be near the penetration on both sides. Markings should be at each directional change of all piping systems. Mechanical room pipe color and the color of bands shall be as follows:

<u>PIPING SYSTEMS AND CONTENTS</u>	<u>SHERWIN WILLIAMS, COLOR NUMBER</u>	<u>STENCIL COLOR</u>	<u>IDENTIFICATION</u>
Condensate Drain	SW 4016	Corrugate Brown	COND
Water, Chilled Supply/Open	SW 4079	Laser Blue	CWS
Water, Chilled Return/Open	SW 4079	Laser Blue	CWR
Water, Cold Domestic	SW 4085	Safety Green	DOM CW
Hot Water Heating Supply	SW 4030	Nickel Grey	HWS
Hot Water Heating Return	SW 4030	Nickel Grey	HWR
Hot Water/Glycol Heating Supply	SW 4030	Nickel Grey	HWS/G
Hot Water/Glycol Heating Return	SW 4030	Nickel Grey	HWR/G
Chemical	SW 4004	Safety Yellow	
Ductwork	SW 4030	Nickel Light Grey	
Supports, Hangers	SW 4032	Vacuum Black	
Water, Condenser Supply			
Water, Condenser Return			

- C. Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.

- D. For insulated pipe systems, stencil sizes should be as follows:
1. For pipes up to 1 inch, use 1 inch letters.
 2. For pipes 1 inch to 2 inches, use 2 inch letters.
 3. For pipes 2 inches to 6 inches, use 3 inches letters.
 4. For pipes above 6 inches, use 4 inch letters.
- E. For un-insulated systems, stencil sizes should be as follows:
1. For pipe diameters up to 1 inch, use ½ inch letters.
 2. For pipe diameters from 1 inch to 2 inches, use 1 inch letters.
 3. For pipe diameters from 2 inches to 6 inches, use 2 inch letters.

3.6 VALVE IDENTIFICATION:

- A. Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, HVAC terminal devices, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
- C. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operation of more than single machine room.

3.7 MECHANICAL EQUIPMENT IDENTIFICATION:

- A. Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
1. Main control and operating valves, including safety devices.
 2. Pumps, boilers and similar units.
 3. Fans, terminal units and primary balancing dampers.
 4. Packaged HVAC units, heat pumps and rooftop units.
 5. Tanks and heat exchangers.
- B. Lettering Size: Minimum 3/8" high lettering for name of unit where viewing distance is less than 2'-0", 3/4" high for distances up to 6'-0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 the size of principal lettering.
- C. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, and warn of hazards and improper operations.
- D. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.

END OF SECTION 23 09 70

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SECTION 23 09 80 – TESTING AND BALANCING

PART 1 - GENERAL

1.1 SCOPE:

- A. This work includes testing all mechanical equipment including the rooftop units and exhaust fan to determine that its performance is in compliance with the requirements of the contract documents and the adjustment and balancing of the systems so that fluid quantities are delivered to locations as required by the contract documents and that the temperature, and/or volume can be controlled in accordance with the design intent and space requirements. This work shall not imply a guarantee of the total system, nor shall it relieve contractors or manufacturers of their normal responsibilities.
- B. A mandatory sum in the amount of \$12,000 will be withheld (in addition to normal 5% retainers) until such time as the tab report is found to be accepted to the engineer.
- C. The mechanical contractor shall perform all work described in preparation of equipment and systems for testing and balancing.
- D. The actual testing and balancing of the air system shall, including all exhaust fans and RTU units and terminal units, shall be performed by a separate firm specializing in testing and balancing of mechanical equipment. The T&B sub-contractor shall meet the standards but not necessarily be a member of the Associated Air Balance Council, or shall be an engineering firm with principals registered in N.C. and specializing in testing and balancing of HVAC systems. The mechanical contractor shall be responsible for test and balance of the system.
- E. Testing and balance shall not begin until the system has been completed and is in full working order. The mechanical contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation and shall continue the operation of same during each working day of testing and balancing.
- F. The mechanical contractor shall pay the costs of operating the mechanical equipment during the testing and balancing period. He shall make arrangements with the Owner to pay for his electrical power and water.

PART 2 - PRODUCTS - not used

PART 3 - EXECUTION

3.1 PREPARATION OF EQUIPMENT FOR TESTING AND BALANCING:

- A. The mechanical contractor shall, upon completion of items of work required by his contract and prior to the commencement of the Testing and Balancing Subcontract, as hereinafter specified, thoroughly clean all dirt and debris from equipment. All bearings, gear boxes, wearing surfaces, or other equipment components requiring lubrication shall be properly serviced as recommended by the equipment manufacturer, and shall be tagged with the date of service and type of lubricant used. All specified cleaning and protective devices shall then be installed in equipment, and systems shall be placed in continuous operation. All other mechanical

equipment, including temperature and operating control devices shall have been adjusted and calibrated for complete and functional operating service.

- B. The mechanical contractor shall provide the Testing and Balancing Sub-contractor at the earliest possible time, copies of all approved equipment, specialties, and control submittal data, together with a set of contract plans and specifications.
- C. The mechanical contractor shall provide all thermometer wells, pressure gauge connections, capped duct thermometer openings, etc., as the T&B sub-contractor require. The T&B sub-contractor shall assist the mechanical contractor in locating these devices as the job progresses.
- D. The sub-contractor shall provide sufficient time from the complete installation of all systems to the final established completion date of this project so that testing and balancing can be accomplished.

3.2 TESTING PROCEDURES FOR AIR SYSTEMS:

- A. Test and adjust blower RPM to design requirements. Record all pulley and belt data.
- B. Test and record motor full load and operating amperes and voltage on all three phases.
- C. Make pivot tube traverses of main supply ducts and obtain design CFM at fans. Also make velocity traverses of all coils and filter banks.
- D. Test and record system static pressures, suction and discharge.
- E. Test and adjust system for design recirculated air, CFM.
- F. Test and adjust system for design CFM outside air.
- G. Test and record entering air temperatures. (D.B. heating and cooling).
- H. Test and record entering air temperatures. (W.B. cooling).
- I. Test and record leaving air temperatures. (D.B. heating and cooling).
- J. Test and record leaving air temperatures. (W.B. cooling)
- K. Adjust all main supply, return, and exhaust air ducts to proper design CFM.
- L. Adjust all zones to proper design CFM supply, return, and exhaust.
- M. Test and adjust operation of frequency drive fans.
- N. Test and adjust each diffuser, grille, and register to within 5% of design requirements.
- O. Size, type, and manufacture of diffusers, grilles, registers, and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations and checked against field measurements.
- P. All fire dampers and combination fire-smoke dampers shall be tested to prove they open and close properly.

- Q. All diffusers, grilles, and registers shall be adjusted to minimize drafts and noise in all areas.
- R. As a part of the work of this contract, the mechanical contractor shall make any changes in the pulleys, belts, and dampers required for correct balance at no additional cost to owner or engineer.

END OF SECTION 23 09 85

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SECTION 23 09 85 - SYSTEMS TESTING, CLEANING AND START-UP

PART 1 - GENERAL

1.1 SCOPE:

- A. This work includes cleaning the various air and water systems, pressure testing to insure tightness, and start-up of the various systems to prove their operational capability.

PART 2 - PRODUCTS

2.1 GENERAL

- A. This contractor shall provide all water and other materials used for testing.

PART 3 - EXECUTION

3.1 TESTS FOR PIPING SYSTEMS

- A. Pipe pressure testing: Prior to testing, remove or otherwise protect from damage all control devices, trap bellows, air vents, or other devices not designed to withstand the test pressure.
- B. Piping Pressure Tests: The following system shall be hydrostatically tested at a pressure of 1-1/2 times the normal working pressure, or 125 psi, whichever is greater:
 - 1. Hot Water Piping
 - 2. Equipment Vents
 - 3. Tanks and Equipment (25 psi above working pressure)
- C. All work must remain uncovered until required tests have been completed but in the event that the project construction schedule required it, this contractor shall make arrangements for prior tests on portions of the work involved. All costs of these tests shall be paid by this contractor. Any damage caused as a result of tests shall be repaired at the expense of this contractor.
- D. It is desirable that each system be tested in its entirety, but the various systems may be tested in sections as may be required to expedite the work of other trades.
- E. Test pressure shall be maintained without pumping for a minimum of 4 hours without loss of pressure other than may be attributable to changes in atmospheric conditions. Sweats or drips will not be accepted.
- F. After satisfactory completion of tests and before permanently connecting equipment, traps, strainers, etc. flush entire pipe systems for sufficient length of time to free interiors completely of foreign matter.

3.2 LEAKAGE TESTING FOR MEDIUM PRESSURE SYSTEM:

- A. All ductwork shall be tested for air leakage. Testing shall be done by the test and balance subcontractor, and repair of leaks shall be done by the sheet metal subcontractor.
- B. The installed medium pressure duct system shall be tested at 4" WC pressure.
- C. The air leakage at the test pressure shall be measured by a calibrated orifice type of flow meter. Total allowable leakage of the system shall not exceed 2% of the air handling capacity of the system.
- D. If the system is tested in sections, the leakage rates shall be added to give the performance of the whole system.
- E. Leakage concentrated at one point may result in objectionable noise even if the system passes the leakage rate criteria. This noise source must be corrected to the satisfaction of the engineer.
- F. The orifice of flow measurement device must have been individually calibrated against a primary standard, and this calibrated curve permanently attached to the orifice tube assembly.
- G. Testing must be in accordance with a printed procedure submitted to the engineer for approval.

3.3 TESTS FOR LOW PRESSURE DUCT:

- A. All ductwork shall be tested for air leakage. Testing shall be done by the test and balance subcontractor, and repair of leaks shall be done by the sheet metal subcontractor.
- B. All low pressure supply, return and exhaust duct, plenums, casings shall be tested and made airtight before covering or concealing. Supply duct, plenums, and casings shall be tested under 2" WC positive pressure. Return and exhaust ducts and casings shall be tested under 1 inch WC positive pressure. Substantially airtight means that less than 5% air leakage when the system is subjected to the test pressure.
- C. Tests shall be made before insulation is applied to joints, fittings, or valves. The A/E representative shall be given the opportunity to observe all tests and items under test shall not be covered up until after the A/E representative has observed the test or has been given a letter waiving the right of observation of the test.

3.4 DUCT LEAKAGE

- A. Total allowable leakage of the combined medium and low pressure duct system from the fan discharge to the diffuser discharges shall not exceed 5% of the air handling design flow capacity of the system.

3.5 CLEANING OF SYSTEMS:

- A. The inside of the air terminal units, ducts, plenums, and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust and then shall be vacuum cleaned before installing outlet faces. Equipment shall be wiped clean, with all traces of oil, duct, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and new filters shall be installed after all construction dirt has been removed from the building and the ducts, plenums; casings, and other items specified

hereinbefore have been vacuum cleaned. It shall be the responsibility of this contractor to maintain the system in this clean condition until final acceptance.

- B. Clean all piping systems, equipment, and accessories (especially pumps, valves, flange faces, gauges, etc.) of cutting chips and foreign matter while installing.
- C. Temporary bypasses shall be provided for all water coils to prevent flushing water from passing through coils.
- D. All hot water heating, chilled water cooling systems, and condenser water systems shall be internally cleaned of all grease, dirt, cutting oils, sand, welders slag, and all materials foreign to the systems intended usage. All strainer elements (screens) shall be removed from the system; water and cleaning chemicals shall be flushed and/or pumped through all system components and piping with all system valves wide open, out the full size openings where strainer elements have been removed and out the full size drain valves. Cleaning chemicals shall be approved by the Designer and Owner. The cleaning shall be witnessed by Lowe's maintenance personnel. All system components shall be protected from pressure exceeding working pressures and temperatures. All shall be left clean and charged with the normal working fluids.

3.6 STRAINER SCREENS:

- A. Strainer screens should be 4 to 6 mesh monel and shall be removed and cleaned every day the system is operating until no dirt collects. At that time the screen shall be removed permanently so that the pressure drop due to the screen is eliminated saving pumping energy. Screen element shall be wired to the strainer with stainless steel or copper wire for future use, should the system be modified or drained down in the future.
- B. The inside of the air terminal units, ducts, plenums, and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust and then shall be vacuum cleaned before installing outlet faces. Equipment shall be wiped clean, with all traces of oil, duct, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and new filters shall be installed after all construction dirt has been removed from the building and the ducts, plenums; casings, and other items specified hereinbefore have been vacuum cleaned. It shall be the responsibility of this contractor to maintain the system in this clean condition until final acceptance.
- C. Clean all piping systems, equipment, and accessories (especially pumps, valves, flange faces, gauges, etc.) of cutting chips and foreign matter while installing. Refer to Section 23 09 40 for piping system cleaning compounds.
- D. Temporary bypasses shall be provided for all water coils to prevent flushing water from passing through coils.

3.7 GENERAL:

- A. Be careful to provide all sight glasses, control valves, pumps, and any items that could be damaged by foreign material with 40 mesh screen on the inlet side, or bypass, or remove such items.
- B. Clean out the condensers, air separators, and all low velocity areas where dirt accumulated.
- C. Protect all water systems from freezing.

- D. Clean all strainers and dirt legs.

3.8 START-UP AND TEST:

- A. Each system shall be started up and a preliminary test made as follows:

1. This contractor shall make trial runs of each piece of equipment furnished by him. This contractor shall provide all oil, grease, and other lubricants for the operation of all equipment until acceptance. This contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up-to-date of acceptance of the equipment, and for a period thereafter as per the general building warranty. The contractor shall be required to protect all bearings during installation and shall thoroughly grease steel shafts to prevent corrosion.
2. The contractor shall align each shaft and adjust all pulleys to run substantially vibration-free. Where equipment cannot be so adjusted by the contractor, the manufacturer shall provide a machinist or serviceman to make these adjustments. Vibration-free is construed to mean that rotating machinery shall not exceed a self-excited vibration velocity of 0.10 inches per second in any direction when measured with a vibration meter on the bearing caps of the machine.
3. Belts shall be checked for alignment and tightened to proper tension.
4. Overload elements in motor starts shall be checked and proper elements provided as required for the motor full load amp rating.
5. Glands, seals, etc. shall be examined and properly adjusted.
6. Air vents shall be bled.
7. Equipment shall be started per manufacturer's instructions and run in.
8. Read amperage and voltage on each motor the first time it is started, and check direction of rotation.

- B. Run an operating test on each piece of equipment. The tests shall be sufficient to show that the equipment has been run and observed and shall include the following:

1. Boiler operating pressure, feedwater temperature, flue gas temperature, fuel oil temperature.
2. Chiller inlet and outlet temperature, amp. draw, refrigerant suction and condensing temperatures.
3. Each fan amp. draw and discharge static pressure.
4. Temperature of air entering and leaving each coil in air handling unit.
5. Pressure drop across each filter bank service other than individual rooms.
6. Relative humidity leaving each humidifier in a make-up air handling unit and/or air handling unit.

7. Volts and amps on each motor.

C. Results of preliminary tests shall be submitted before test and balance sub-contractor commences his work.

END OF SECTION 23 09 85

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SECTION 23 09 87 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Instruction and train operating personnel in the operation and maintenance of mechanical systems in the building and any other systems deemed necessary.

1.2 REFERENCE STANDARDS:

- A. ASHRAE Guideline 0

1.3 TYPE OF TRAINING:

- A. Instruction shall be on-site.
- B. Provide the services of a competent Contractor or manufacturer's engineers and qualified maintenance personnel to adequately train designated persons in the proper operation and maintenance of all mechanical systems.
- C. The Operating and Maintenance Manuals prepared by the Contractor, manufacturer's literature of the actual equipment installed and copies of approved posted operating instructions shall be used as a basis for the training.
- D. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
- E. Time Period of Training: As specified in the various specification sections, or longer as required to fully instruct Owner's designated operation and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.
- F. All training sessions will be visually recorded using either video tape (DVD format) or standard compact disk (CD) in PC format.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TIME OF SUBMITTAL:

- A. Submit training materials and instruction schedule to the Architect and Commissioning Agent at least 15 days prior to start of formal maintenance training classes.
- B. Arrange mutually agreeable dates for receiving training with the Owner, through the Architect within the thirty day period preceding Substantial Completion.

- C. Reminders of each training period shall be sent to Owner's Project Manager and Commissioning Coordinator ten days before each session.

3.2 CERTIFICATION:

- A. The Contractor shall have the training attendee's sign for the training upon completion of the session being performed. This sheet acknowledging receipt of training shall describe the training performed, the date and the names, titles and signatures of the people attending.

END OF SECTION 23 09 87

SECTION 23 09 90 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS - BUILDING:

- A. The HVAC contractor shall keep a record copy of the bid set and fabrication drawings at the job site and shall accurately maintain a record with dimensions and elevations of all changes to the contract drawings as the job progresses. At the completion of the job, this contractor shall obtain a clean set of drawings from the Architect and shall make changes which occurred during construction on drawings and submit three (3) copies to the Engineer. After approval furnish the final as-built drawings to the engineer.
- B. Show all valve and equipment numbers.
- C. Provide complete equipment and piping schematics showing all devices and all thermometers and gauges with normal operating temperature and pressure.
- D. Revise all equipment schedules to show actual equipment furnished.

1.2 DEMONSTRATION OF COMPLETE MECHANICAL SYSTEMS:

- A. After installation has been completed, equipment has been tested, systems placed in permanent operation, and all adjustments made, a competent start-up technician shall be provided for a period of five working days. This technician shall be provided for a period of 5 working days. This technician shall operate the system during this time, and during this time shall instruct the Owner's designated representatives in the operation and maintenance of the equipment. The start-up technician shall be at the site continuously during working hours during the instructional period. Systems to be operated include, but are not necessarily limited to:
 - 1. All control systems
 - 2. Condenser water system
 - 3. Chilled water system
 - 4. Hot water system (with and without glycol)
 - 5. All fan systems
- B. Performance Tests: Should, in the opinion of the Designer and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this contract, the right is reserved for the Owner and/or Designer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If the test indicates a deficiency in equipment capacity or performance, the contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Designer.

1.3 OPERATING AND MAINTENANCE MANUALS:

- A. The form in which the operating maintenance manual is to be presented shall be subject to approval by the Architect. Three copies of the manual shall be provided.

- B. The following items, together with any other necessary and pertinent data, shall be included in the manual. This list is not necessarily complete and is only to be used as a guide.
1. Suggested settings of all control and switches for normal operation with description of control and its location.
 2. A check list for periodic maintenance of all equipment, with maintenance and cleaning instructions.
 3. As built wiring, interlock, and control diagrams for the equipment, with color coding shown on wiring and interlock diagrams.
 4. Parts list for all replaceable service parts, and indicate where they may be purchased.
 5. Manufacturer's cuts and rating tables for all equipment, including copies of all shop drawings.
 6. Oiling, lubricating, and greasing data, showing how to lubricate, frequency, and which lubricants to use.
 7. Complete electrical load data from operation tests.
 8. Test data on all equipment.
 9. Belt sizes, types, and lengths.
 10. Serial numbers of all principal pieces of equipment.
 11. Valve tag schedule (framed).
 12. Manufacturers', suppliers, and subcontractors' names, addresses, and telephone numbers.
 - a. The first page shall identify project and give name, address and phone number of Architect, Engineer, Mechanical and Electrical sub-contractors and any service companies involved and give name and night phone of each party responsible for service.
 13. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the Equipment Room.

1.4 LABELS, IDENTIFICATION AND TAGS:

- A. All control components for equipment shall be identified using 3/4" high permanent engraved bakelite nameplates - white letter-black background, with minimum 1/4" high letters. Nameplates shall be permanently attached to device or to wall or mounting panel above device.
- B. All equipment including but not limited to compressors, pumps, equipment cabinets shall be identified with yellow 1 inch high letters. Permanent engraved bakelite nameplates - yellow letters - gray background with minimum 1/4 inch high letters. Permanently attach nameplate to equipment.
- C. Tag all valves with 1 inch diameter stamped brass tags numbered in sequence. Tags shall also be identified as to the type of piping. Secure with brass chain.

1.5 VALVE TAG SCHEDULE:

- A. Copies of the valve tag schedule and wiring diagrams shall be framed under glass and posted in the equipment room.

1.6 SPARE FILTERS:

- A. Provide three complete sets of filters for each air handling unit - The first installed prior to start-up of unit, the second at final acceptance, and a third set as spare filters delivered to the Owner's representative.

1.7 WARRANTIES:

- A. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

1.8 PUNCH LIST:

- A. During construction period the Engineer will issue punch lists. These items shall be completed before Engineer will approve next application for payment. Final punch list work shall be completed before acceptance.

1.9 FINAL INSPECTION AND ACCEPTANCE:

- A. The architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
 1. Submit a list of uncompleted items, if any, and advise when the items will be done.
 2. Complete all items on Architect's or Engineer's prefinal punch list.
 3. Final inspection and tests of the completed construction shall be performed in the presence of the Architect or his representative and shall be at such times as are convenient to the Architect. Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by this HVAC contractor at his own expense.

1.10 FINAL CLEAN UP:

- A. During construction this HVAC contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises and to remove all evidence of his work.
- B. The mechanical contractor shall resolve all questionable items to be corrected prior to an inspection by the Engineer. If items have not been corrected completely, and additional site visits are required for the Engineer to check for compliance, the mechanical contractor will be billed by the Owner at \$90.00 per hour plus travel expenses for Engineer's services.

1.11 GUARANTEE:

- A. The guarantee shall be as stated in the General Conditions, and the General Provisions of this section.

END OF SECTION 23 09 90

SECTION 26 01 00 - GENERAL PROVISIONS – ELECTRICAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. The work covered by these specifications consists of furnishing all labor, equipment, supplies, and materials, and performing all operations, including cutting, channeling, chasing and patching necessary for the installation of complete lighting and power wiring systems, in accordance with the contract documents.
- B. The Contract Drawings indicate the extent and general arrangement of the electrical work. The drawings and specifications shall be considered supplementary, one to the other, so that materials and workmanship indicated, called for or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. All labor and material required to perform all work in conjunction therewith whether or not indicated or specified shall be furnished and installed as part of this work.
- C. See section 26 01 11 for general outline of electrical work.
- D. The electrical subcontractor may also be referred to in this specification as electrical contractor. The electrical contractor may also be referred to in this specification as “this contractor”, “contractor”, “Contractor”, “Division 26 contractor” or “electrical subcontractor”.

1.2 DRAWINGS AND SPECIFICATIONS:

- A. It is understood that while drawings shall be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the Contract Documents will be fully explained if application is made to the Engineer in accordance with the General Conditions and Supplements thereto. However, should conditions arise where, in the judgment of the Contractor, certain changes will be advisable, the Contractor shall communicate with the Engineer and secure his review of these changes before proceeding with the work, provided they are of a major nature.
- B. The drawings are diagrammatic and are not intended to show each and every conductor, fitting, device, conduit, or a complete detail of all the work to be performed, but are for the purpose of illustrating the type system and special conditions necessary for the experienced electrician to take off his material and lay out his work. They are not intended to define construction methods. The Contractor shall be responsible for making such measurements as may be necessary at the Project and adapting his work to the project conditions.

1.3 APPLICABLE SPECIFICATIONS AND STANDARDS:

- A. The following specifications and standards, as applicable to the materials and methods specified, shall be considered part of these specifications:
 - 1. AEIC American Association of Edison Illuminating Companies
 - 2. ANSI American National Standards Institute
 - 3. ASHRAE/IESNA 90.1 Code - 2007

- | | | |
|-----|-------------------------------------------------------|--------------------------------------------------|
| 4. | ASTM | American Society for Testing and Materials |
| 5. | BAS | Building Automation System |
| 6. | ETL | Electric Testing Laboratories |
| 7. | NCSBC | The 2018 North Carolina State Building Code |
| 8. | NCECC | North Carolina Energy Conservation Code |
| 9. | ICEA | Insulated Cable Engineers Association |
| 10. | IEEE | Institute of Electrical and Electronic Engineers |
| 11. | NEC | National Electrical Code - 2017 |
| 12. | NEMA | National Electrical Manufacturers Association |
| 13. | NESC | National Electrical Safety Code |
| 14. | NFPA 72 | National Fire Alarm and Signaling Code – 2019 |
| 15. | UL | Underwriters' Laboratories Inc. |
| 16. | OSHA | Occupational Safety and Health Standards |
| 17. | NCDoA STS – Telecommunications 1000 Wiring Guidelines | |
| 18. | UNC Charlotte Design and Construction Guidelines | |

- B. All referenced manufacturer's requirements and specifications and nationally recognized and accepted standards and specifications shall be the latest edition unless specified otherwise and shall be used as they are applicable for products and craftsmanship incorporated in the Contract Drawings and this Section only. The references to these standards and specifications do not imply acceptance of any and all products described in the standards and specifications.

1.4 APPLICABLE REGULATIONS:

- A. The installation shall comply with the 2017 edition of the National Electrical code and rules and regulations of the 2018 North Carolina State Building Code. In no case shall the materials and workmanship fail to meet the minimum requirements of the National Electrical Code.

1.5 CERTIFICATION

- A. The contractor shall secure and pay for all permits, fees, inspections, and licenses required. Upon completion of the job, he shall present to the Engineer a Certificate of Inspection and approval from the inspection authorities.

1.6 SUBMITTALS:

- A. All submittals shall be reviewed, corrected as necessary prior to submitting to Engineer and stamped "Approved" by the contractor, or the responsible subcontractor.

B. Materials List:

1. As soon as practicable and in accordance with the General Conditions of the Contract, and before commencement of installation of any materials or equipment, submit six copies of a complete schedule of the materials and equipment proposed for installation and of names of specialty subcontractors for approval by the Engineer.
2. The schedule shall, as soon as possible, be supplemented by catalog cuts, diagrams, lighting fixture brochures, shop drawings, field working drawings and such descriptive data as may be required by the Engineer. In the event any items of materials or equipment contained in the schedule fail to comply with the specification requirements, such items will be rejected.

3. Where shop drawings are called for in other sections of the specifications, the list shall name the manufacturer and item and state "Shop Drawings to Follow."
 4. The Engineer shall be notified immediately - in writing, of delivery scheduling of the material not ordered for immediate shipment. The first payment estimate will not be approved until the Engineer is satisfied that all material is ordered and delivery scheduled so that there will be no delay to the job because of getting material. The contractor may be required to remove and replace at his own expense any material installed before approval.
- C. Shop Drawings: Shop drawings shall be submitted conforming to the requirements stated in Division 26, General Requirements, and in the Supplementary General Conditions, within 60 days of the issue of the notice to proceed for the following items:
1. Building Wire and Cable
 2. Building Luminaires
 3. Wiring Devices
 4. Lighting Control Systems
 5. Disconnect Switches
 6. Fire Alarm System
- D. Operation and Maintenance Manuals
1. The contractor shall compile and bind 3 printed sets, and one electronic set in PDF format, of all operation and maintenance manuals, equipment and parts lists, instructions, and descriptive literature furnished by the manufacturers of the furnished equipment to assist in the proper maintenance and operation of equipment. These instructions shall be turned over to the architect with application for final payment, and final payment will not be made until received. Each brochure shall include 1 copy of each of all approved shop drawings, catalog pages, instruction sheets, operating instructions, installation and maintenance instructions, and spare parts bulletins.
 2. The contractor shall submit warranties and guarantees in one commercial quality, hardback binder sized to accommodate 8.5 by 11 inch pages, with a table of contents and two (2) copies of each warranty or guarantee. Marked tabs shall separate warranties and guaranties in sections following the order of the specs.
- 1.7 EQUIPMENT SIZES:
- A. Listing of a manufacturer as a source of acceptable equipment does not relieve the contractor and the manufacturer of this equipment from the requirement of meeting all aspects of the contract documents including that of having to fit the equipment in the space allocated.
- 1.8 WARRANTY:
- A. The electrical work shall be guaranteed for one-year against all deficiencies as specified in the General Conditions.
 - B. Special equipment extended warranties as specified in other sections.

1.9 SITE INSPECTION:

- A. Each electrical bidder shall visit the site of the work and familiarize himself with the character and conditions of the job site. The Contractor shall not be excused from doing required work because he did not visit the site.

1.10 RECORD DRAWINGS:

- A. The Contractor's competent supervisor shall maintain on the job site one complete set of contract documents of all trades, and shall coordinate with other trades so as to avoid conflicts. The Engineer field representative will visit the contractor's office periodically and shall be allowed to inspect the record set of drawings to verify that they are being kept up to date.
- B. The Contractor shall provide one set of marked plans to Engineer, as the Owner's representative, for his preparation of record drawings. The marked plans shall indicate all changes and deviations from the original contract documents. Each change shall be marked, in red ink, in a clear, legible manner, keying it to the appropriate change order, clarification note, or field authorization note, as applicable.
- C. Contractor's electrical record drawings shall be submitted within 30 days after the date of building acceptance, as required by ASHRAE Standard 90.1 – 2007.

1.11 PAINTING:

- A. Provide prime and finish painting of all exposed electrical conduit, raceways, wireway, boxes and related supports. Finish color shall be as required to match adjacent surfaces, unless otherwise directed by owner.
- B. Any electrical item factory painted that has a damaged or abraded area shall be touched-up to match surrounding finish unless it is rejected by the Engineer.

1.12 ABBREVIATIONS:

- A. The following abbreviations may be found in this specification and in the drawings.

1.	A	Ampere
2.	AC	Alternating Current
3.	A/E	Architect/Engineer
4.	ADA	Americans with Disabilities Act
5.	AEIC	Association of Edison Illuminating Companies
6.	AHJ	Authority Having Jurisdiction
7.	ANSI	American National Standards Institutes, Inc.
8.	ASTM	American Society for Testing and Materials
9.	ASYMM	Asymmetrical
10.	AWG	American Wire Gauge
11.	BAS	Building Automation System
12.	C	Conduit
13.	CAS	Campus Automation Systems
14.	CBM	Certified Ballast Manufacturers
15.	CFM	Cubic Feet per Minute
16.	DB	Decibel

17.	DC	Direct Current
18.	ETL	Electric Testing Laboratories
19.	F	Fuse or Fahrenheit, as applicable
20.	GFI	Ground Fault Interrupter
21.	HZ	Hertz
22.	GRC or RMC	Galvanized Metal Conduit, Schedule 40
23.	HV	High Voltage
24.	IEEE	Institute of Electrical and Electronic Engineers
25.	IMC	Intermediate Metal Conduit
26.	KV	Kilovolt (1000-volt)
27.	KVA	Kilovolt Ampere
28.	MA	Milliampere
29.	MCM	Thousand Circular Mil or KCMil
30.	NEC	National Electrical Code
31.	NEMA	National Electrical Manufacturers Association
32.	NFPA	National Fire Protection Association
33.	NOC	Normally Open Contact
34.	NCC	Normally Closed Contact
35.	NCDol	North Carolina Department of Insurance
36.	NCSBC	2018 North Carolina State Building Code
37.	PVC	Polyvinyl Chloride
38.	RMC or GRC	Rigid Galvanized Metal Conduit, Schedule 40
39.	RMS	Root Mean Square
40.	RNMC	Rigid Galvanized Non-Metallic Conduit
41.	RS	Rapid Start
42.	SYMM	Symmetrical
43.	SCO	State Construction Office
44.	UL	Underwriters' Laboratories, Inc.
45.	UPS	Uninterruptible Power Supply

PART 2 - PRODUCTS:

2.1 MATERIALS:

- A. All materials used in this work shall be new unless otherwise noted. All materials used on this project shall be UL listed and labeled, where they have established a standard for the material to be installed. Any material installed that is not labeled shall be subject to a field evaluation by one by one of the third party agencies which have been approved by the North Carolina Building Code Council at the contractor's expense, if authorized by the authority having jurisdiction and the Engineer. Otherwise, any item not listed and labeled by UL shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are labeled. Materials are all items other than labor that are part of the electrical contract, including, but not limited to, devices, appliances and equipment.
- B. Catalog numbers and trade names in these specifications and noted on the drawings are intended to describe the class of the material, devices or apparatus wanted and not to limit competition.
- C. Where a manufacturer's catalog number is used, all parts shall be furnished that are required to make it complete and fit the construction intended.

- D. The contractor may not install alternate equipment unless the substitution was requested within Bid period and approved under requirements of Division 01 – General Requirements.
- E. The contractor shall be responsible for the security and storage of his/her materials and equipment.
- F. Materials from listed manufacturers shall only be acceptable if they can properly fit in the allocated spaces without interference from building walls, ceilings, piping conduit, ducts or other equipment.
- G. The contractor, through the manufacturer of the equipment specified here, shall review the use, details, and methods of installation of his product as indicated and shall disclose to the Engineer any and all deviations from his recommended use and method of installation and shall also disclose to the Engineer his recommendations for the use and method of installation of his product to achieve the intended purpose and result. Such disclosure shall be made within the time stipulated for submission of shop drawings.

PART 3 - EXECUTION

3.1 PHASING AND SEQUENCING OF WORK:

- A. Work under Division 26 - Electrical shall be staffed, phased and scheduled to satisfy the owner's facility use schedule.

3.2 FEES AND PERMITS:

- A. Contractor shall secure and pay for all permits, fees, inspections and licenses required.

3.3 DIMENSIONS:

- A. Unless specific dimensions are shown, locations of outlets, equipment connections, etc. are approximately and shall be verified by reference to related documents (i.e. shop drawings and equipment shop drawings).

3.4 WORK INSPECTIONS AND OBSERVATIONS:

- A. Contractor shall cooperate with Engineer during the performing of project observations and project punch lists during the construction and post-construction (warranty) periods. Electrical work shall not be covered until reviewed by the Engineer and the AHJ. The AHJ for electrical work is the State Construction Office State Electrical Inspector. Contractor shall open and close equipment doors and equipment cover, as required to gain access to equipment for observation by the Engineer as many times as requested. Provide qualified electricians to assist Engineer during observations and while performing punch listings.
- B. The Contractor shall notify the Office of the State Electrical Inspector at the State Construction Office to schedule required inspections, including rough-in, and final inspections.

3.5 COORDINATION OF WORK:

- A. Installation of electrical conduits, boxes and equipment shall not interfere with access to other equipment, its controls or its maintenance.
- B. Conduit shall be installed in a way that does not weaken, or interfere with, the structural system for the building.
- C. Relocation of outlets, equipment, conduit, system connections or rough-in locations up to twenty feet, if necessary, in any direction shall be done at no additional cost to the Owner or its agents if identified as required, or communicated to the contractor, before roughing-in.
- D. The contractor shall verify that the electrical equipment to be installed fits in the assigned space, and can be easily maintained by University Facilities Operations staff, prior to running any conduit or installing the equipment. Any potential conflict shall be brought to the attention of the Engineer at once.
- E. Requests for information (RFI) answers provided by the Engineer to contractor's RFI's do not constitute authorization to change the requirements of the contract documents. The contractor shall submit a change order request for consideration by Engineer for any equipment, material, wiring method, or other work that as a result of the outcome of an RFI, may require changes from the original contract documents. No deviation from the original contract is authorized until the change order request is approved.

3.6 SUPERVISION:

- A. The contractor shall have in charge of the work at all times during construction, a thoroughly competent foreman with extensive experience in the work to be performed under this contract. The foreman shall be a licensed electrician certified by the State of North Carolina. Anyone deemed not capable by the Engineer shall be replaced immediately upon request, and after a satisfactory foreman has been assigned, he shall not be withdrawn without the written consent of the Engineer.

3.7 CUTTING AND PATCHING:

- A. This Contractor shall do all cutting and patching necessary for the proper installation of his work and shall repair any damage done by himself or his workmen.

3.8 WASTE MATERIALS:

- A. The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by his employees or work and shall cleanup scraps and seep floors each day workers are at the job site. At the completion of the work he shall remove all leftover materials, equipment and debris resulting from the work done under this Division.
- B. Waste that is classified by law, state or Federal agencies as hazardous or toxic, like fluorescent lamps, ballasts, or other equipment containing PCB's, shall be discarded through bonded hazardous waste disposal facilities utilizing methods prescribed by law. Prior to discarding waste, coordinate all recycling and disposal tasks with the University Office of Recycling at 704-687-0607.

3.9 ACCESS TO EQUIPMENT:

- A. All equipment shall be installed in location and manner that will allow for convenient access for maintenance and inspection. Adjust location shown on drawings for placement of electrical equipment to assure that the required clearances are maintained.

3.10 INTERRUPTION OF ELECTRICAL UTILITIES:

- A. The Contractor shall coordinate all necessary power outages with the University, as required, by giving a written notice. No power shall be reinstated to any facilities or equipment until an inspection and certificate is obtained from the NC State Construction Office of the Electrical Inspector.

3.11 CONTINUATION OF ELECTRICAL SERVICES:

- A. It is imperative that all utilities and services be maintained at all times except for scheduled interruptions. Should emergency repairs be required to systems that exist within construction limits, the Contractor shall cooperate with the Owner to insure that these services are restored as soon as possible. Provide all necessary temporary services and connections required to provide uninterrupted continuance of building services except as otherwise permitted by Owner.

END OF SECTION 26 01 00

SECTION 26 01 11 – ELECTRICAL OUTLINE OF WORK

PART 1 - GENERAL

- A. Provide a complete electrical installation including, but not necessarily limited to the following items:
1. Branch circuit, connection and disconnect switch to all HVAC, Plumbing and Fire Protection equipment requiring electrical connections
 2. Modifications to existing panelboards
 3. Branch circuits, including conduits, conductors, outlets, boxes, receptacles, switches and fittings for all equipment requiring electrical power, outlets and fixtures
 4. Complete wiring system and connection to all equipment requiring electrical connections.
 5. Lighting system including fixtures, lamps, ballasts and circuits
 6. Lighting controls meeting current ASHRAE 90.1 Standard
 7. Wiring devices with cover plates
 8. Grounding systems
 9. Voice and data cable raceway system
 10. Power to Divisions 21, 22 and 23 equipment requiring line power (120V or higher voltage), as shown on drawings and described in Section 26 01 20
 11. Raceway system including conduit, boxes and pull wires for all telecom and data outlets
 12. Modifications to existing addressable fire alarm system

END OF SECTION 26 01 11

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SECTION 26 01 20 – DIVISION OF WORK (DIVISIONS 23/26)

PART 1 - GENERAL

1.1 GENERAL

- A. This section delineates the DIVISION OF WORK between Division 23 and Division 26. The same rules described for Division of Work between Divisions 23 and 26 apply to Division of Work between Division 21 and Division 26 and between Division 22 and Division 26.

1.2 DIVISION OF WORK

- A. All individual motor starters for mechanical equipment (fans, pumps, etc.), shall be furnished and installed under Division 23. There are no motor control centers for this project.
- B. Under Division 26, generally, power wiring, including line power wiring to some Division 23 control panels, shall be up to a termination point consisting of junction box, trough, starter, VFD, or disconnect switch. Under Division 26, line side terminations shall be provided. Wiring from the termination point to the mechanical equipment, including final connections, shall be provided under Division 23, as shown on the electrical drawings.
- C. Duct smoke detectors shall be provided by Division 26, installed by Division 23, and wired under Division 26. Fire alarm AHU shut down control circuits shall be wired from the fire alarm auxiliary relay module, or fire alarm control panel, to a termination point adjacent to AHU equipment controller under Division 26 as directed by HVAC controls contractor. Wiring from the termination point to the equipment controller shall be under Division 23.
- D. Power and control wiring for equipment rated at less than 115 volts, and for all relays, actuators, including motorized dampers, timers, seven-day clocks, alternators, pressure, vacuum, float, flow, pneumatic-electric, and electric-pneumatic switches, aquastats, freezestats, line and low voltage thermostats, thermals, remote selector switches, remote push-button stations, emergency break-glass stations, and interlocking devices, shall be provided by the contractor or subcontractor furnishing the equipment or control item. Power wiring of disconnect switches beyond termination point, and other appurtenances associated with equipment under Division 23 shall be furnished, installed and wired under Division 23.
- E. All wiring required for power, controls and instrumentation for Division 23 systems, not indicated on the electrical drawings, shall be furnished and installed by Division 23.
- F. Additional power wiring required for HVAC equipment over and above what the electrical drawings show shall be provided by the HVAC contractor.
- G. 120 Volts, 60 Hz power supply for Division 23 control functions, if not shown on electrical drawings being directly provided, or provided in adjacent junction box by Division 26, shall be provided under Division 23 utilizing spare circuit breakers in branch circuit panelboard with type of power compatible with the control function.
- H. Mechanical equipment with built-in disconnects provided under Division 23 shall be wired under Division 26 to the disconnect. HVAC equipment controllers without built-in disconnect switches will be provided with separate disconnect switch under Division 26. Wiring from the switch to the equipment shall be under Division 23.

- I. The electrical contractor shall provide under Division 26 the following 120 volts control power wiring:
 - 1. 120 Volts circuit to each mechanical (Division 23) controls panel
 - 2. 120 Volts circuit wiring to mechanical controls and dampers

- J. Additional controls power wiring required for HVAC, Plumbing of Fire Protection equipment over and above what the electrical contractor is required to provide in accordance with Division 26 documents shall be provided by Division 23 contractor.

END OF SECTION 26 01 20

SECTION 26 02 35 – ELECTRICAL TESTING

PART 1 - GENERAL

1.1 GENERAL

- A. Provide testing of electrical wiring and systems as specified here.

1.2 DOCUMENTATION

- A. All tests specified shall be completely documented indicating time of day, date, temperature and all pertinent test information.
- B. All required documentation of readings indicated above shall be submitted to the engineer prior to, and as one of the pre-requisites for, final acceptance of the project.

1.3 GROUND SYSTEM TESTING

- A. Refer to Section 26 05 26

1.4 ELECTRICAL LOAD BALANCE TESTS AND SYSTEMS CONTINUITY TESTS

- A. With all the loads connected to the power system, verify that load is suitably balanced among the three phases of the power distribution system and that the system circuits are free of interruptions, faults, and accidental grounding.

1.5 FIRE ALARM SYSTEM TESTS

- A. Refer to Section 28 31 11 for requirements.

END OF SECTION 26 02 35

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SECTION 26 05 19 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This Section applies to secondary power and signaling conductors for systems rated 600 volts and below.
- B. A complete system of conductors shall be installed in the raceway systems as specified here and shown on drawings.

1.2 APPLICABLE SPECIFICATIONS AND STANDARDS:

- A. Compliance: The materials specified here shall meet the following specifications and standards in their current edition.
- B. UL Standards:
 - 1. Insulation tape
 - 2. Wire Connectors and Soldering lugs
- C. NEMA Standards:
 - 1. Thermoplastic - Insulated WC 5 (IPCEA S-61-402)
- D. General:
 - 1. All wire and cable shall be listed by an "approved" third party testing agency.
 - 2. All wire and cable shall be run in raceway, unless otherwise specifically noted.

PART 2 - PRODUCTS

2.1 CONDUCTORS:

- A. All conductors shall be made of copper. All wire shall be new, manufactured within six (6) months of project award. If requested, contractor shall provide manufacturer's certification giving date of manufacture.
- B. Each conductor shall bear easily readable markings along entire length, indicating size and insulation type.
- C. Conductors, unless otherwise noted, shall be heat and moisture resistant grade, thermoplastic insulated. Conductors No. 8 AWG and larger shall be stranded Class B copper conductors, dual rated, Type THHN-THWN or XHHW, 600-volt insulation. Conductors No. 10 and smaller shall be solid copper, Type THHN-THWN (dual rated), or XHHN, except otherwise required below.

- D. Except as otherwise noted in technical specification sections, conductors for signal and control circuits above 50 volts AC shall be stranded type, THWN-THHN as permitted by NEC, No. 14 AWG. Conductors for signal and control circuits below 50 volts AC or DC may be 300-volt, PVC insulated, stranded No. 14 AWG, except as otherwise noted on corresponding technical section of this specification.
 - E. Branch circuit conductors shall be not smaller than No. 12 AWG, except as noted here or on the drawings. Conductors for branch circuits whose length from panel to the first outlet in the circuit exceeds 50 feet for the 280/120 volt system shall not be smaller than No. 10 AWG, but not smaller than what is scheduled on panelboard schedule. Conductors for branch circuits whose length from the panel to the first outlet box in the circuit exceeds 125 feet for the 480/277 volt system shall not be smaller than No. 10 AWG, but not smaller than what is scheduled on panelboard schedule. Oversized conductors feeding multi-outlet assemblies may be reduced, at the outlet box used to feed the multi-outlet assembly, to a size conductor rated to match the circuit breaker ahead of the circuit, if the use of the larger conductors will exceed the wiring capacity of the assemblies. Where branch circuit conductor are increased to No.10, the grounding conductor shall also be increased to No.10 to comply with NEC 250.122.
 - F. Insulated grounding conductors exposed in spaces used for air return shall be listed for the application.
 - G. Conductors being connected to transformers and other equipment shall have a temperature rating as required by the transformer or equipment manufacturer.
 - H. Fire alarm system conductors shall be stranded copper conductors.
 - I. Conductors in any location subject to abnormal temperature shall be furnished with an insulation type suitable for temperature encountered as designated by the NEC.
- 2.2 METAL CLAD CABLE:
- A. Metal clad cable Type MC is not allowed.
- 2.3 COLOR CODING:
- A. Conductors, feeders, and branch circuits shall be color coded by phases as follows:
 - 1. 480/277 volts systems: Phase A-Brown; Phase B-Orange; Phase C-Yellow; Neutral-Natural (light) Gray; Grounding Wire-Green
 - 2. 208/120 volts systems: Phase A-black; Phase B-red; Phase C-blue; neutral-white; Grounding wire-green.
 - 3. Insulating tape of proper color shall be used to identify the phase conductors No. 4 AWG and larger conductors at each termination and at each junction or pull box. Conductors #6 AWG and smaller shall be factory color coded.
 - B. Provide color coding diagram on each piece of power distribution equipment as required by NEC.

- C. All wiring lugs, including but not limited to, breakers, panelboard / switchboard lugs, safety switch lugs, and transformers lugs, shall be rated for use with 75C or higher temperature conductors.

PART 3 - EXECUTION:

3.1 SPLICES:

A. Solid Conductor Splices:

1. Solid conductors namely those sized #10, #12, and #14 AWG copper, shall be spliced by twisting securely and by means of Ideal 'wing nuts', 3M Company's 'Scotchlok' or twist on wire connectors in junction boxes and light fixtures.
2. "Sta-Kon" or other permanent type crimp connectors shall not be used.

B. Stranded Conductor Splices:

1. Namely #6 AWG and larger, shall be spliced by approved mechanical pressure type connectors or lugs plus gum rubber tape or friction tape. Solderless mechanical connectors, for splices and taps provided with U.L. approval insulating covers, may be used instead of mechanical connectors plus tape. Circuit joints shall not be made with terminal screws of wiring devices.

3.2 INSTALLATION OF CONDUCTORS:

- A. Conductors shall be continuous from outlet to outlet, and no splices shall be made except within outlet or junction boxes, troughs and gutters. Pull boxes may be utilized where required. If other than long radius bends are required, pull boxes sized in accordance with the NEC shall be used. Location of feeder pull boxes shall be subject to approval by Engineer and shall be included with installation drawing submittal.
- B. Conductors in vertical runs shall be supported as required by NEC utilizing listed and approved support fittings.
- C. Conductors shall be labeled within all junction boxes, etc. using plastic "punch" tape identifying the conductors according to circuit numbers.
- D. Where connected under screw or bolt heads, stranded wire shall be fitted with a lug of proper size. Make solid conductor loops clockwise so as to be forced closed as screw is tightened. Only one solid wire loop may be held under a single screw.
- E. Make all connections tight. Torque-tighten all connections to lugs per manufacturers' and UL requirements.
- F. Wires within panel boards, terminal cabinets and similar equipment shall be neatly squared and "bunched" together and held with plastic ties.
- G. Provide a dedicated, separate neutral conductor for each circuit requiring a neutral. The neutral carrying all or any part of the current of any specific load or run shall be contained in the same raceway or enclosure with the phase wire or wires also carrying that current. No split neutrals

permitted. For lighting, motor, appliance, circuits and receptacle circuits where two or more circuits are run in the same conduit, provide a separate neutral for each circuit.

- H. Do not run more than 3 single-phase, 277 or 120 volts, branch circuits, each with separate neutral, in the same conduit. All other circuit shall be run in separate conduits. Do not run more than one 3 single-phase 208, 240 or 480 volts branch circuits in same conduit. Do not run more than one 3-phase circuit in same conduit. Each feeder, regardless of configuration shall be run in its own, not shared, conduit. Provide grouping of circuits as required by NEC.
- I. Circuit shall be connected to panels as shown on the drawings.
- J. Under the above requirements and with required color coding system, no feeder or branch circuit raceway will contain more than one wire of the same color, except for switch legs and control circuits. The only exception is as otherwise noted for 208, 240 or 480 volts, single phase branch circuits.
- K. Insulation on conductors #6 AWG and smaller shall be suitable colored in manufacturing.
- L. Where no indication is made of wire size, the conductor shall be sized per NEC requirements to match its overcurrent protective device, but in no case smaller than #12 AWG.
- M. Unless noted otherwise, or another arrangement is approved by the Engineer, busses in panels and switchgear shall be considered "A", "B", and "C" from left to right, top to bottom, or front to back when facing equipment.
- N. Control and signal wiring shall not use the above named colors except green for grounding. Any other colors or striping may be used but the coding shall provide same color or striping between any two terminals being jointed.

3.3 CONDUCTOR SEQUENCE AND ROTATION:

- A. All feeders, sub-feeds to panels, motors, etc., shall be completely phased out as to sequence and rotation. Phase sequence shall be A-B-C from front to rear, top to bottom, left to right when facing equipment.

3.4 CONNECTION OF OVERSIZED CONDUCTORS TO CIRCUIT BREAKERS AND SWITCHES:

- A. When oversized branch circuit conductors are scheduled to be connected to circuit breakers, or switches, not having the capability to accept the larger conductor, provide splice in suitable junction box as close as possible to circuit breaker, but not further than 10 feet from circuit breaker, equipment or device being connected, as approved by the A/E, and connect to circuit breaker with the largest conductor that fit the circuit breaker.
- B. For similar situations for feeder, or large branch circuits, (circuit breakers rated 125 amperes and larger) provide lugs as required by feeder conductors.

END OF SECTION 26 05 19

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

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:
 - 1. Category 5e balanced twisted pair cable.
 - 2. Balanced twisted pair cabling hardware.
 - 3. RS-485 cabling.
 - 4. Low-voltage control cabling.
 - 5. Control-circuit conductors.
 - 6. Identification products.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
- D. RCDD: Registered Communications Distribution Designer.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency, RCDD, layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.
 - 1. Flame Travel Distance: 60 inches or less.
 - 2. Peak Optical Smoke Density: 0.5 or less.
 - 3. Average Optical Smoke Density: 0.15 or less.
- C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.
- D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.
- E. RoHS compliant.

2.2 CATEGORY 5e BALANCED TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.
- B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.
- C. Conductors: 100-ohm, 24 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: Green thermoplastic.

2.3 BALANCED TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate balanced twisted pair copper communications cable.

- B. General Requirements for Balanced Twisted Pair Cable Hardware:
1. Comply with the performance requirements of Category 5e.
 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 3. Cables shall be terminated with connecting hardware of same category or higher.
- C. Source Limitations: Obtain balanced twisted pair cable hardware from single source from single manufacturer.
- D. Plugs and Plug Assemblies:
1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded balanced twisted pair cable.
 2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.
 3. Marked to indicate transmission performance.
- E. Jacks and Jack Assemblies:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded balanced twisted pair cable.
 2. Designed to snap-in to a patch panel or faceplate.
 3. Standards:
 - a. Category 5e, unshielded balanced twisted pair cable shall comply with IEC 60603-7-2.
 4. Marked to indicate transmission performance.

2.4 LOW-VOLTAGE CONTROL CABLE

- A. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
1. Multi-pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
 2. PVC insulation.
 3. Unshielded.
 4. PVC jacket.
 5. Flame Resistance: Comply with NFPA 262.

2.5 CONTROL-CIRCUIT CONDUCTORS

- A. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
- B. Class 2 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

2.6 FIRE-ALARM WIRE AND CABLE

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG.
 - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

2.7 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test twisted pair cables according to TIA-568-C.2.
- C. Cable will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Test cables on receipt at Project site.
 - 1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 26 05 31 "Conduit" and 26 05 41 "Boxes and Enclosures" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
 - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
 - 2. Outlet boxes for cables shall be no smaller than 4 inches square by 2-1/8 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
 - 3. Flexible metal conduit shall not be used.
- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.

- C. Install manufactured conduit sweeps and long-radius elbows if possible.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.

- B. General Requirements for Cabling:

1. Comply with TIA-568-C Series of standards.
2. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets.
3. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
4. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
5. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
7. Support: Do not allow cables to lie on removable ceiling tiles.
8. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
9. Provide strain relief.
10. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
11. Ground wire shall be copper, and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.

- C. Balanced Twisted Pair Cable Installation:

1. Comply with TIA-568-C.2.
2. Do not untwist balanced twisted pair cables more than 1/2 inch (12 mm) at the point of termination to maintain cable geometry.

- D. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.

- E. Open-Cable Installation:

1. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 30 inches apart.
2. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

- F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches.
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches.
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.5 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
 1. Class 1 remote-control and signal circuits; No 14 AWG.
 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.6 FIRESTOPPING

- A. Comply with requirements in Section 26 05 39 "Fire Seals."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

3.7 GROUNDING

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For low-voltage control wiring and cabling, comply with requirements in Section 26 05 26 "Grounding and Bonding Systems."

3.8 IDENTIFICATION

- A. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.
- B. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire shall have a unique tag.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections with the assistance of a factory-authorized service representative.
- E. Tests and Inspections:
 - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- F. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

- G. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- H. Prepare test and inspection reports.

END OF SECTION 26 05 23

SECTION 26 05 26 - GROUNDING AND BONDING SYSTEM

PART 1 - GENERAL:

1.1 SCOPE:

- A. Grounding and bonding of the electrical power system.

1.2 GENERAL:

- A. The power distribution system shall be grounded at each voltage level. The conduit and neutral conductors of the wiring systems and all electrical equipment shall be grounded. The ground connection of the electrical system neutral and conduit system shall be made at the main service switchboard or main power device.
- B. Each conductive, non-current carrying, part of the electrical system shall be bonded to an equipment grounding conductor sized in accordance with NEC.
- C. The raceway system shall not be relied on as the sole grounding path for ground continuity. A green grounding conductor, properly sized per NEC Table 250.122, shall be run in all raceways (except telecommunications, data, and audio conductor's raceway) to ground each conductive, non-current carrying part of the electrical power system. This conductor shall be bonded to each metallic conduit, box and cabinet that is part of the related power system raceway.

PART 2 - PRODUCTS:

2.1 GENERAL:

- A. All products shall be new and listed for the use intended.
- B. Equipment grounding conductors, for other than supplementary grounding system or within spaces used as air plenums, shall have 600 volt insulation and shall be as specified in Section 26 05 19.
- C. Grounding conductors, where insulated, shall be colored solid green. Conductors intended as neutral shall be colored solid white on 120/208V circuits and natural gray on 277/480V circuits. Supplementary grounding field conductors shall be #1/0 AWG, bare stranded tinned copper conductors.

PART 3 - EXECUTION:

3.1 INSTALLATION AND WORKMANSHIP:

- A. Conductors inside building shall be installed above non-air plenum ceilings at accessible locations, preferably mounted on walls. Conductors penetrating walls or floors shall be provided with sleeves. Support conductors at intervals not exceeding 6 feet.

- B. Installation of Connectors: Connectors shall be installed in strict accordance with manufacturer's instructions.
- C. Any feeder raceway anywhere in the system which enters a box or cabinet through part of a concentric knock-out shall be fitted with a bonding bushing and jumper. The jumper shall be sized by NEC Table 250.102 and be lugged to the box.
- D. Boxes with concentric, eccentric or oversized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per NEC Table 250-102 and lugged to the box.

3.2 EQUIPMENT GROUNDING, ETC.

- A. Ground all fixed and portable appliances and equipment connected under the project with a green grounding conductor. This wire shall be carried inside the raceway and flex from equipment to nearest grounding portion of raceway system. Connect at both ends with suitable lugs.

END OF SECTION 26 05 26

SECTION 26 05 29 - SUPPORTS AND FASTENERS

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. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.
- C. Full and proper support shall be provided for all items of electrical equipment, raceways, etc. All materials, whether exposed or concealed, shall be firmly and adequately held in place. Fastening and support shall afford safety factor of three or higher.
- D. All fixtures, raceways, and equipment shall be supported from the structure. Nothing may be supported from suspended ceilings or HVAC ducts.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Atkore International.
 - g. Wesanco, Inc.
 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 4. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - c. MKT Fastening, LLC.
 - d. Simpson Strong-Tie Co., Inc.
- G. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-Line, Inc.
 - b. Empire Tool and Manufacturing Co., Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - e. MKT Fastening, LLC.

H. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

I. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

J. Toggle Bolts: All-steel springhead type.

K. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1 1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps, as applicable.
 - 2. To Light Steel: Sheet metal screws.
 - 3. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

3.3 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 31 - CONDUIT AND RACEWAYS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Conduit

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Requirements of Section 26 01 00 shall apply.

1.3 ABOVE GROUND CONDUIT:

- A. Minimum size conduit for interior above-ground power circuit applications shall be $\frac{3}{4}$ inch.
- B. Conduit size shall be as required to comply with the latest edition of the NEC unless larger conduit is indicated on drawings.
- C. All wiring shall be in electrical metallic tubing, 'EMT', except as otherwise noted.

PART 2 - PRODUCTS:

2.1 MANUFACTURERS:

- A. Conduit system components shall be as manufactured by GE, Kaiser, Republic or T&B.

2.2 ELECTRICAL METALLIC TUBING:

- A. Electrical metallic tubing shall be rigid metal conduit of the thin-wall type in straight lengths, elbows or bends for use as raceways for wire or cables in an electrical system.
- B. Electrical metallic tubing shall utilize hexagonal steel type compression threadless fittings of plated steel. All compression fittings shall be UL listed for concrete-tight and rain-tight construction. All EMT connector fittings shall be provided with insulated throats. Pot metal, set screw or indented type fittings shall not be utilized.

2.3 FLEXIBLE METALLIC TUBING:

- A. Flexible metallic conduit shall conform to UL standard 'Flexible Steel Conduit'. All steel used in the fabrication of the conduit shall be zinc coated.
- B. Liquid-tight flexible steel conduit shall be provided with a protective jacket of polyvinyl chloride extruded over a flexible interlocked galvanized steel core to protect outdoor wiring against moisture, oil, chemicals and corrosive fumes.

2.4 TERMINATIONS:

- A. Where concentric, eccentric or oversized knockouts are encountered, a grounding-type insulating bushing shall be provided.
- B. Metallic conduit connectors shall be nylon-insulated.
- C. Flexible conduit connectors shall have insulated throats and "anti-short" bushings.

2.5 CONDUIT COUPLINGS:

- A. Split or "Erickson" coupling shall be OZ Gedney or approved equal.
- B. Conduit couplings for GRC and PVC shall be in accordance with the NEC.
- C. Flexible conduit couplings shall have UL listed insulated throats.
- D. EMT – Steel, hexagonal compression type.

PART 3 - EXECUTION:

3.1 INSTALLATION:

- A. Provide green insulated grounding conductor in every conduit, except fire alarm and control circuits less than 50 volts. Do not rely on conduit as equipment ground.
- B. 100-pound rated nylon pull wire shall be installed in all empty conduit longer than 10 feet, except as otherwise noted. Pull wire shall be secured at each end and tagged for identification of the use of the conduit.
- C. Grounding type insulated bushings shall be used where raceway enters boxes with concentric or oversized knockouts. These bushings shall also be used wherever conduits stub into switchboards or transformer cabinets. Grounding type insulated bushings shall always be used on both ends of conduits feeding panelboards.
- D. Provide suitable fittings where raceway crosses building expansion joints.
- E. Run raceway concealed in finished areas.
- F. The use of "LB's" shall be limited as much as possible.
- G. Conduit shall be securely fastened to all sheet metal enclosures with double galvanized locknuts and insulated bushings, care being observed to see that the full number of threads project through to permit the bushings to be drawn tight against the end of conduit, after which the locknuts shall be made sufficiently tight to ensure positive ground continuity between conduit and box.
- H. Conduits installed on the interior of exterior building walls shall be spaced off the wall surface a minimum of ¼ inch using "clamp-backs" or strut.
- I. Conduit shall be supported on approved types of galvanized wall brackets, ceiling trapezes, strap hangers, or pipe straps, secured by means of toggle bolts on hollow masonry units, expansion

bolts in concrete or brick, machine screws on metal surfaces, and wood screws on wood construction. Nails shall not be used as the means of fastening boxes on conduits. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure conduit supports.

- J. Conduits shall be installed in such manner as to insure against trouble from the collection of trapped condensation, and all runs of conduit shall be arranged so as to be devoid of traps where feasible. The contractor shall exercise the necessary precautions to prevent the lodgment of dirt, plaster, or trash in conduit, fittings, and boxes during the course of installation. A run of conduit which has become clogged shall be entirely freed of these accumulations or shall be replaced.

END OF SECTION 26 05 31

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SECTION 26 05 35 – CONDUIT AND OTHER REQUIREMENTS FOR DATA AND VOICE CABLING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section describes requirements for the conduit system and related items required to be provided under Division 26 – Electrical for the installation of cabling system being provided by the Owner for the following systems.
 - 1. Voice/Data Cabling
 - 2. Wireless Communications

1.2 APPLICABLE REQUIREMENTS:

- A. The requirements of the following specifications shall also apply to the work:
 - 1. 26 01 00 – General Provisions - Electrical
 - 2. 26 05 31 – Conduit and Raceways

PART 2 - PRODUCTS

2.1 FIRE STOPPING PENETRATIONS:

- A. All penetrations through walls, floors and ceilings will be sleeved and fire-stopped to re-establish the integrity of fire-rated architectural structures and assemblies to appropriate building codes and EIA/TIA 569-A. If the partition is not rated seal off the penetration with duct seal for a depth of not less than 2 inches, unless other openings exist that can be utilized.
- B. Existing fire-stopping material, which is disturbed or damaged by work, shall be replaced and restored to code.
- C. Conduit sleeves shall be cut flush with the wall/floor on each side and provided with bushing.
- D. No PVC sleeves shall be used for penetrations.
- E. All penetrations for fire rated walls shall be fire-stopped and sealed per an approved UL Design.
- F. Submit to the building official a copy of the approved UL design used for fire-stopping and sealing of firewall penetrations.
- G. All penetrations through any wall shall be sound-proofed.

2.2 CONDUITS:

- A. Typical telecom outlets shall consist of a 5" x 5" backbox and a 1 1/4" conduit, except larger conduit shall be provided when so indicated on the drawings. Conduit shall be run from outlet to within 10"-12" of telecommunications cable tray. Provide insulating bushings on conduit ends to prevent damage to communication cables. Install bushing prior to pulling cable.

2.3 OUTLET BOXES:

A. Usage:

1. Outlet boxes shall be installed at the termination of the conduits which connect the outlet locations to the wireway.

B. Material:

1. 5" x 5" x 2 7/8" steel, square cornered, welded construction in dry wall with two-gang "mud" ring. Surface boxes shall be 5" x 5" x 2 7/8" deep, cast metal type. All boxes for telecommunications cabling shall have two-gang opening unless noted otherwise on drawings. Each outlet box shall extend a dedicated conduit from the box to telecommunications cable tray. A nylon pull cord shall be included in each empty conduit. Provide stainless steel, blank, temporary cover plate on each telecommunications outlet box.

C. Additional Requirements:

1. Conduit for low voltage cabling shall be run overhead and not under/in slab whenever possible.
2. All conduits shall have no continuous sections longer than 100 feet without a j-box. All conduits shall not have two 90 degrees or a reverse bend (U shape) between pull points without a pull box.
3. Pull and splice boxes shall be labeled on the exposed exterior per TIA/EIA-606. Labeling shall be easily visible.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Pull lines shall be provided in each raceway for use in installing telephone and data cables. The pull lines shall be nylon rope of no less than 3/32 inch diameter and securely anchored at each end. Each pull line shall be numbered with same distinctive number at both ends of the line for ease in identification. Provide not less than 12 inches of slack.
- B. Refer to referenced sections for additional requirements.
- C. The conduit systems specified here shall be installed in such a manner that no length of run shall exceed 100 feet and shall not contain more than two 90-degree bends or the equivalent.

- D. All work above the ceiling partitions shall be coordinated with the other trades. All conduits passing through firewalls and smoke partitions shall be firestopped after installation of cabling is complete.
- E. For other requirements refer to Section 26 05 31.

END OF SECTION 26 05 35

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SECTION 26 05 37 - SLEEVES AND PENETRATIONS

PART 1 - GENERAL:

1.1 SCOPE:

- A. Provide sleeves, seals and openings for raceway penetrating exterior walls, interior masonry walls and partitions, floors, and roofs as specified here.
- B. All sleeves, seals and openings required shall be located and provided by this Contractor for his portion of the work prior to the pouring of the concrete slabs, and shall be done in a way that does not interfere with the structural system.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Conduit and Raceways - Section 26 05 31
- B. Fire Seals - Section 26 05 39

PART 2 - PRODUCTS

2.1 CONDUIT SLEEVES, SEALS AND ESCUTCHEONS:

- A. Provide sleeves for each conduit passing through walls, partitions, floors and roofs.
- B. Sleeve Material:
- C. Type / Designation
 - 1. 18 gauge, adjustable or fixed length, galvanized steel, Pipe Shields Inc. or equal.
 - 2. Standard weight galvanized steel pipe or conduit.
 - 3. Standard weight galvanized steel pipe or conduit with a continuous welded stop of ¼" steel plate extending outside of sleeve a minimum all around, similar to R&S Manufacturing Corp. Fig. 204.
 - 4. Cast iron pipe sleeve with center flange, similar to James B. Clow and Sons No. F-1430 and F-1435.
 - 5. Thru-wall fitting type: Refer to Section 26 05 35.
- D. Sleeve Sizes:
 - 1. Sleeves for conduit or cables shall be adequate size to accommodate a minimum of ½" clearance between inside of sleeve and outside of pipe.

E. Sleeve Lengths:

Location	Sleeve Length
Floors	Equal to depth of floor construction including finish. In waterproof floor construction sleeves to extend minimum of 2" above finished floor level.
Walls and Partitions	Equal to thickness of construction and terminated with surfaces.

F. Sleeve Caulking and Packing:

Type	Designation	Caulking and Packing Requirements
A		Refer to Section 26 05 31 for requirements.
B		Space between conduit or cable, and sleeve shall be caulked with a fire resistant foam sealant. This applies also to all telecommunication wiring sleeves and conduits penetrating fire rated walls or floors.
C		Space between conduit or cable, and sleeve shall be packed with mineral wool and sealed tight with acoustical caulking.

G. Sleeve Application:

Sleeve Type	Location	Sleeve Caulking & Packing Type Designation
1	Interior fire rated walls, partitions and floors	B
	Interior non-fire rated stud walls and partitions	C
	Interior non-fire rated masonry walls and partitions	C
2	Membrane, waterproof floor and wall construction	B
3 or 4	Exterior walls	A
5	No membrane, waterproof, roof and wall construction where flashing is required.	A or B

H. Escutcheons:

1. Provide escutcheons on all exposed conduit passing through walls, floors, partitions and ceilings.
2. Escutcheons shall be held in place by internal spring tension or set screws.

I. Application:

<u>Location</u>	<u>Escutcheon Material</u>
Finished spaces chrome-plated brass	Anodized aluminum
Unfinished spaces, excluding mechanical equipment rooms	Plain brass, cast iron or aluminum

2.2 PENETRATIONS THROUGH ROOF:

- A. Penetrations through roof shall be accomplished by roof contractor at the expense of Division 26 electrical contractor.
- B. Pipe curbs for raceway and piping passing through roof shall consist of a roof curb, curb covers, and resilient caps with stainless steel clamp sized for passing pipe. Curb covers shall be not less than 12 inches square and where multiple covers are required, galvanized steel troughs shall be provided between covers to provide a watertight assembly. Covers shall be fabricated of ABS plastic with pre-punched mounting holes and a laminated acrylic coating. Sealing caps shall be EPDM compression molded rubber, with openings sized for passing pipe or piping and with stainless steel clamps.
- C. When feasible, penetrations through roof may be combined in a single pipe curb with piping provided under other trades.
- D. Required penetrations through roof for connections to roof top equipment and exhaust fans shall be through the designated area within the roof top unit within roof curb provided with the equipment whenever feasible as directed by HVAC subcontractor.

2.3 CORE DRILLS

- A. New openings on existing wall, floor and roof shall be core-drilled. After core-drilled hole is accomplished and the conduit, sleeve or cable is installed, proceed to seal opening against water, smoke and fire penetration in accordance with Sections 26 05 31 - "Conduit and Raceways" and 26 05 39 - "Fire Seals."

PART 3 - EXECUTION:

3.1 PLACEMENT OF SLEEVES:

- A. Sleeves shall be furnished and placed and openings located as construction proceeds and in ample time to avoid delay to the work. After construction of wall or floor has been accomplished remove the sleeve and proceed to install raceway or pipe, except that sleeves through floors with membrane waterproofing, fire rated gypsum or plaster drywalls and smoke partitions, shall remain in place properly secured to the slabs or wall.
- B. Where sleeves or grouped raceway and pipe are to be installed in openings concurrent with or subsequent to construction, such items shall be securely fastened in place and the opening filled and patched with material approved for the particular construction.

- C. Sleeves and openings shall be protected during all phases of construction. Care shall be taken to prevent concrete, plaster or other construction material from closing the sleeve.
- D. Submit to the Architect/Engineer for approval plan of proposed sleeve locations and sites prior to performing any sleeve works.

END OF SECTION 26 05 37

SECTION 26 05 39 - FIRE SEALS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Work includes furnishing and installing fire and smoke barrier penetration seals for openings in floors, walls, and other elements of construction, whether the floors or walls are fire rated or not.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 26 05 37 - Sleeves and Penetrations

1.3 QUALITY ASSURANCE:

- A. Applicator Qualifications: Two years of experience installing UL Classified fire stopping materials.
- B. Performance: Materials shall have been tested to provide fire rating equal to that of the construction.

1.4 SUBMITTALS:

- A. Shop Drawings:
 - 1. Submit shop drawings showing each condition requiring penetration seals indicating proposed UL systems materials, anchorage, methods of installation and actual adjacent construction.
 - 2. Submit a copy of UL illustration of each proposed system indicating manufacturer approved modifications.
- B. Manufacturer's Data: Submit copies of manufacturer's specifications, recommendations, installation instructions, and maintenance data for each type of material required. Include letter indicating that each material complies with the requirements and is recommended for the applications shown.
- C. Applicators Qualifications Statement: List past projects indicating required experience.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, grade and UL label where applicable. Coordinate delivery with scheduled installation date to allow minimum storage time at site. Store materials in clean, dry, ventilated location. Protect from soiling, abuse, and moisture. Follow manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS:

- A. Furnish adequate ventilation if using solvent. Furnish forced air ventilation during installation if required by manufacturer. Keep flammable materials away from sparks or flame. Provide masking and drop cloths to prevent contamination of adjacent surfaces by fire stopping materials.

1.7 GUARANTEE:

- A. Submit copies of written guarantee agreeing to repair or replace joint sealers which fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The guarantee period shall be one year from date of Owner's acceptance.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following manufacturers as further defined in the Systems and Applications Schedule in Part 3 of this Section.
 - 1. Hilti
 - 2. 3M Company Barrier Caulk
 - 3. US Gypsum - Thermafiber Insulation
 - 4. Vimasco Corporation, Nitro-West Virginia
 - 5. Nelson
 - 6. Wrap/Strip moldable putty sheet forms
 - 7. STI
 - 8. UNIQUE

2.2 MATERIALS:

- A. Provide materials classified by UL to provide fire stopping equal to time rating of construction being penetrated.
- B. Provide asbestos free materials that comply with applicable codes and have been tested under positive pressure in accordance with UL 1479 or ASTM E814.

2.3 QUICK INSTALLATION SLEEVES:

- A. Through-the-wall fire rated sleeves used for telecommunication wiring shall be of the quick-to-install, re-usable insulation system, design rated for penetrations through concrete block walls with fire rating of up to 3-hour and gypsum walls with rating of up to 4-hour, as manufactured by Hilti CP 653 speed sleeve, or equivalent from UNIQUE, 3M or STI.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. All holes or voids created to extend electrical systems through fire rated floors and walls shall be sealed by the electrical contractor with an intumescent material capable of expanding up to 10 times when exposed to temperatures beginning at 250 degrees F. It shall be UL classified and have ICBO BOCAI and SBCCI INER 243 approved ratings to 4 hours per ASTM E-814 (UL 1479).
- B. Clean surfaces to be in contact with penetration seal materials, of dirt, grease, oil, loose materials, rust or other substances that may affect proper fittings, adhesion, or the required fire resistance.
- C. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction. Seal holes or voids made by penetrations to ensure an effective smoke barrier. Where floor openings without penetrating items are more than four inches in width and subject to traffic or loading, install fire stopping materials capable of supporting same loading as floor. Protect materials from damage on surfaces subject to traffic.

3.2 FIELD QUALITY CONTROL:

- A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspection by applicable code authorities. Perform under this section patching and repairing of fire stopping caused by cutting or penetration by other trades.

3.3 ADJUSTING AND CLEANING:

- A. Clean up spills of liquid components. Neatly cut and trim materials as required. Remove equipment, materials and debris leaving area in undamaged, clean condition.

3.4 SYSTEMS AND APPLICATION SCHEDULE:

- A. Construction conditions presented here are not necessarily encountered in this project and do not imply approval of any particular type of raceway listed here. Refer to Section 26 05 31 - Conduit for type of raceways allowed in this project.

<u>Construction Condition</u>	<u>UL Designation</u>
Metal Conduit through Round Opening	CAJ1007, WJ1010, CAJ1027, JAJ1037 CAJ-1023, CAJ1044, CAJ7001, FB1002 WJ1001, WJ1042
Metal Conduit through Large Opening	CBJ1015, CAJ1002, CAJ1006

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

Blank Opening	CAJ0001, CAJ0002, CAJ0004, CBJ0007, CAJ0009, J900B, J900C, U900J, U900L
Metal Conduit through Gypsum Board Wall	WL1001
Cables through Gypsum Board Wall	WL3001

END OF SECTION 26 05 39

SECTION 26 05 41 - BOXES AND ENCLOSURES

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Work under this Section includes but is not necessarily limited to the following:
 - 1. Outlet Boxes
 - 2. Cabinets and Enclosures

1.2 APPLICABLE SPECIFICATIONS AND STANDARDS:

- A. Equipment specified in this Section shall meet the following specifications and standards.
 - 1. UL Standards
 - a. Electric Cabinet and Boxes
 - b. Outlet Boxes and Fittings
 - 2. NEMA Standards
 - a. Boxes, OS1

1.3 QUALITY ASSURANCE:

- A. The contractor, through the manufacturer of the equipment specified here, shall review the use, details, and methods of installation of his product as indicated and shall disclose to the Architect any and all deviations from his recommended use and method of installation and shall also disclose to the Architect his recommendations for the use and method of installation of his product to achieve the intended purpose and result. Such disclosure shall be made within the time stipulated for submission of shop drawings.

1.4 SUBMITTALS:

- A. Submit manufacturer's catalog data on all products specified here.

PART 2 - PRODUCTS

2.1 OUTLET BOXES, PULL BOXES, CABINETS AND ENCLOSURES:

- A. Boxes:
 - 1. Unless otherwise specifically noted, all boxes shall be of the metallic type.
 - 2. Boxes shall have sufficient volume to accommodate the number of conductors entering the box in accordance with the requirements of NFPA 70, Article 314. Outer boxes that are exposed to the weather or that are in normally wet locations shall be of the cast-metal

type having threaded hubs. Boxes shall be of suitable construction for installation in the environment of their location. Unless otherwise specifically stated all boxes shall be metallic boxes used.

3. Fixture outlet boxes on ceiling shall be not less than 4 inch octagonal. Fixture outlet boxes in concrete ceiling shall be of the 4 inch octagonal concrete type, set flush with the finished surface. Fixture outlet boxes on plastered ceilings shall be fitted with open covers set to come flush with the finished surface.
4. Except as otherwise noted, outlet, junction or pull boxes not larger than 5" x 5" in exposed work within 8'-0" from floor shall be of cast steel or alloy with threaded hubs and appropriate covers. Zinc-coated cadmium-plated sheet boxes may be used within electrical and telecom rooms, only.
5. Outlet boxes in unplastered masonry walls shall be tile type.
6. Outlet boxes for use with conduit and tubing for power systems shall be not less than 1½ inches deep unless otherwise noted.
7. A device plate or cover shall be provided for each outlet to suit the outlet.
8. Boxes with concentric, eccentric, or oversized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per NEC Table 250.122 and lugged to the box.

B. Pull Boxes:

1. Pull boxes shall be constructed of code-gauge galvanized sheet metal. Boxes shall be of not less than the minimum size required by the National Electrical Code and shall be furnished with screw fastened covers. When several feeders pass through a common pull box they shall be tagged to indicate clearly their electrical characteristics, circuit numbers and panel designations. Pull boxes coverplates larger than four square feet shall be provided with two handles.

C. Cabinets:

1. Cabinet boxes shall be constructed of zinc-coated sheet steel and shall conform with the requirements of Underwriters' Laboratories "Standards for Cabinets and Cutout Boxes". Unless otherwise noted, cabinet trims shall have a corrosion inhibiting primer and a lacquer finish. Cabinets shall be of suitable construction for installation in the environment of their locations.

PART 3 - EXECUTION

3.1 FIRE RATING:

- A. Boxes shall not be permitted to be installed in walls, slabs, or in decks if installation violates or reduces fire rating of such wall, slab, or deck, unless additional fire proofing is provided to maintain fire rating.

3.2 INSTALLATION OF OUTLETS:

- A. Location of outlets shown on drawings, other than those dimensioned, are only approximate, the Owner shall have the right to make slight changes in the position of outlets if the Contractor is notified before roughing-in is done. The Contractor shall study the general building plans in relation to the spaces surrounding each outlet in order that his work may fit the other work required by these specifications. When necessary, the Contractor shall relocate outlets or junction boxes so that, when fixtures or other fittings are installed, they will be symmetrically located according to room layout and will not interfere with other work or equipment. Do not install outlets back to back in dry wall partitions.
- B. Outlet boxes shall be sized in accordance with NEC. Device boxes shall be sectional type or 4" square equipped with plaster rings as required to mount the device. Set edge flush with finished surface. Boxes may be installed at top or bottom of a masonry course, but be consistent within a space and throughout the project.
- C. Ensure all devices meet ADA requirements and specific project requirements regarding mounting heights and locations. Coordinate questions with Architect and Project Manager:
- D. The following are standard mounting heights:
1. Switch boxes 48" from finished floor to top of device trim plate. Boxes beside doors shall be mounted so edge of trim plate is 2" from edge of door trim on strike side.
 2. Telephone boxes 18" from finished floor to center and vertical. Boxes for wall phones shall be 48" from finished floor to top of device trim plate and vertical.
 3. Panel cans 6' - 4" ($\pm 4"$ in concrete block construction) from finished floor to top of can.
 4. Fire alarm pull stations 48" from finished floor to top.
 5. Fire alarm chimes, horns, flashing lights, etc., 80" to bottom above finished floor or 6" below finished ceiling, whichever is lower, to comply with ADA requirements.
- E. Mount boxes for receptacles to receive device in a vertical position and locate:
1. Centered 18" above finished floor.
 2. Centered 6" above counters, shelves, or cabinets where apparently intended to be so placed.
 3. Centered 4" above high edge of backsplashes.
 4. Where devices are to be ganged, provide boxes to receive devices trimmed with a gang plate.
- F. As soon as installed, all raceway openings shall be closed with plastic inserts to prevent entrance of foreign matter during construction. All enclosures shall be kept clean of any foreign matter.
- G. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match color scheme. This includes covers on boxes above all type ceilings. In addition, the box cover shall be labeled using a permanent, black marking pen to identify circuits or systems in box.

3.3 BOXES AND CABINETS IN FIRE RATED WALLS AND FLOORS:

- A. Outlet boxes in one and two-hour fire rated walls shall be installed in conformance with approved UL methods. UL listed steel electrical outlets, switches, or junction boxes not exceeding 16 square inches in area and 2-3/16" in depth, in hollow walls or partition assemblies

utilizing wood or metal studs or metal framing or channels are permitted, provided such outlet boxes do not exceed an average of 100 square inches per 100 square feet of wall and are staggered not less than 24 inches side-to-side horizontally when openings are provided on either side of the wall.

- B. When location or dimension of outlet boxes does not meet the requirements listed above, protect each outlet utilizing gypsum board sheathing or fire proofing blankets in accordance with UL approved methods if acceptable to the local code authority. One product approved to protect outlets is 3M Company moldable Putty Pads, Catalogue Number MPP-1. Fire proofing material must be independently supported of the box or cabinet being protected.
- C. Provide gypsum board covering on all five sides of cabinets mounted in one or two hour fire rated walls to maintain rating of wall.
- D. Provide additional fire-proofing on underside of fire-rated slabs where floor boxes are installed. Use, as best suited to the project and as approved by the A/E and fire marshal, additional spray-on insulation of layers of gypsum board to maintain floor fire rating.
- E. Do not install outlet boxes or cabinets in 4-hour rated walls.

3.4 OUTLET IDENTIFICATION:

- A. All outlet boxes, junction boxes and pull boxes in equipment rooms and above accessible ceilings shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme. This includes covers on boxes above lift-out and other type accessible ceilings.

END OF SECTION 26 05 41

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Related work specified elsewhere:

1. Furnish and install under Division 26 – Electrical, engraved laminated phenolic nameplates for electrical equipment supplied for the project. Embossed, self-adhesive plastic tape is not acceptable for marking equipment. Nameplate material colors shall be:
 - a. Blue surface with white core for normal 20/208 volt equipment.
 - b. Black surface with white core for normal 480/277 volt equipment.
 - c. Green surface with white core for all equipment related to “emergency” and “legally required standby” systems. Provide bright green surface for 480/277 volt equipment and dark green surface for 208/120 volt equipment.

- B. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.

- C. All outlet boxes other than those containing wiring devices, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined above. This includes covers on boxes above lift-out and other type accessible ceilings.

- D. Provide nameplates at each termination, connection and splice point, in accordance with requirements of NEC 210.5(c) showing the color scheme used to identify the phase, neutral and grounding conductors of each voltage system in the premises. The color coding for the conductors shall be as described in Section 26 05 19.

1.2 NAMEPLATE INFORMATION:

- A. Nameplates for troughs or wireways shall indicate given designation, voltage, phases and number of wires plus circuit designation of trough feeder.
- B. Equipment likely to be energized from two different sources at the same time shall be provided with warning nameplates clearly stating this condition.
- C. Pushbuttons, control and selector switches, and indicating lights in remote control stations shall be identified with engraved laminated plastic name plates affixed to front cover in a suitable location. The nameplate shall carry the identification of the system which is being controlled.

PART 2 - PRODUCTS:

2.1 CONSTRUCTION:

- A. Nameplates shall be 1/8 inch thick of phenolic material with all four face edges beveled 45 degrees, except that nameplates for wiring devices may be 1/16 inch thick of same type construction. Lettering shall be machine engraved to expose contrasting inner core color.
- B. Equipment nameplates shall include ½-inch high lettering for the equipment identification, and 3/8-inch high lettering for the other information..
- C. Lettering for sequence of operation signs, wiring devices and other lengthy explanatory signs, shall be not less than 1/8 inch high.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Affix nameplates to plates or equipment utilizing self-tapping stainless steel screws.

END OF SECTION 26 05 53

SECTION 26 09 25 - OCCUPANCY SENSOR LIGHTING CONTROL SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described here and as shown on drawings.
- B. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.
- C. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems and building management systems.

1.2 APPLICABLE SPECIFICATION SECTIONS

- A. Requirements of the following sections shall apply to work specified in Section 26 09 25:
 - 1. Section 26 01 00 – General Provisions - Electrical
 - 2. Section 26 05 19 – Building Wire and Cable
 - 3. Section 26 05 31 – Conduit and Raceways
 - 4. Section 26 05 39 – Fire Seals
 - 5. Section 26 05 41 – Boxes and Enclosures
 - 6. Section 26 05 53 – Electrical Identification

1.3 EQUIPMENT QUALIFICATION

- A. Products supplied shall be from a single manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five (5) years. Mixing of manufacturers shall not be allowed.
- B. All components shall be UL listed.
- C. Products shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.
- D. Wall switch products must be capable of withstanding the effects of inrush current. Submittals shall clearly indicated the method used.
- E. Occupancy sensor lighting control system shall be fully compatible with the lighting fixtures specified and submitted.
- F. Occupancy sensors that provide automatic switching functions based on "smart" technology incorporating "learning" features are not allowed in this project.

1.4 SYSTEM DESCRIPTION

- A. Provide occupancy sensor-based lighting control system so that lighting is turned on manually by a person entering the space, and turned off automatically after a reasonable time delay when the room or area becomes vacant. Sensors shall be wall or ceiling mounted as shown on drawings and as recommended by system manufacturer for the application.
- B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization.
- C. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The supplier's obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the owner's acceptance of the project. Warranty on both equipment and labor shall be for a minimum period of five (5) years.

1.5 SUBMITTALS

- A. Contractor through the manufacturer of the equipment shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.
- B. Submit a lighting plan at scale 1/8" = 1'-0", or larger, clearly marked by manufacturer showing proper product, location and orientation of each sensor. For typical spaces, like small offices, a typical plan drawing will be sufficient for classrooms and other spaces submit specific plan drawings identifying each space with room number.
- C. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.
- D. Catalog sheets must clearly state any load restrictions when used with electronic ballasts. However, it is the contractor and supplier responsibility to provide any and all supplementary relays circuits and wiring to make system work as intended.

1.6 FACTORY STARTUP

- A. It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system. This service shall be provided as part of work under this section.

1.7 POST INSTALLATION RECORD DRAWINGS

- A. Submit, after completing satisfactorily all field adjustments, a set of revised shop drawing plans indicating final location of sensors, sensor orientation and control relays. In addition, the drawings shall indicate the orientation of each sensors and its time delay setting. Include room numbers and names for each space where an occupancy sensor is located. Include final control wiring diagrams of installations where auxiliary control relays have been used to accomplish lighting control. The drawings shall be sealed, signed, certified and dated by the factory technician that accomplished the work and by the electrical contractor.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the electrical contractor to ensure that any price quotations received and submittals made are for sensors which meet or exceed the specifications included herein.
1. Watt-Stopper
 2. Hubell
 3. Leviton
 4. Novitas
 5. Entertainment Technologies (Division of Genlyte-Thomas)
 6. Lutron

2.2 ULTRASONIC OCCUPANCY SENSORS

- A. The ultrasonic occupancy sensors shall be capable of detecting presence in the control area by detecting Doppler shifts in transmitted ultrasound.
- B. The ultrasonic frequency shall be 25kHz at $\pm 0.005\%$. The sensor shall be precision crystal controlled and shall not interfere with each other when two or more are placed in the same area.
- C. Sensor shall utilize Advanced Signal Processing to automatically adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow through the controlled space. Ultrasonic circuit shall be solid state crystal controlled.
- D. Sensors of varying frequencies shall not be allowed so as to prevent sensors from interfering with each other and to assure compatibility in the event more sensors are added or units are replaced.
- E. Sensor shall have a multi-directional transmitter with temperature and humidity resistant, 25kHz tuned ultrasonic receivers. Ultrasonic receivers shall be temperature and humidity resistant with less than a 6dB shift in the humidity range of 10% to 90% and less than a 10dB shift in the temperature range of -20° to 60°C .
- F. Detection shall be maintained when a person of average size and weight moves only within or a maximum distance of twelve inches either in a horizontal or vertical manner at the approximate speed of 12 inches per second. The sum of this distance, volume and speed represent the average condition ultrasonic sensors must meet in order for the lights to not go off when a person is reading or writing while seated at a desk.
- G. Each sensor shall be furnished with a convenient shunt provision which will enable a custodian or building engineer to bypass the sensor in the event of failure. This bypass provision pin shall remain in the sensor and be visible from the floor as a constant reminder that the automatic function has been bypassed.
- H. Sensors are to be ceiling mounted, shall not protrude more than 1.25 inches, and should blend in aesthetically with the ceiling.
- I. Time delay range shall be adjustable from 15 seconds to 30 minutes.
- J. Sensor shall have user-adjustable sensitivity setting.

- K. Sensors shall cover 360° and up to 2000 square feet in models rated for 500, 1000 and 2000 square feet.
- L. To ensure quality and reliability, sensor shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.
- M. Sensor shall be UL listed.
- N. Sensor shall have a standard 5 year warranty.

2.3 DUAL TECHNOLOGY OCCUPANCY SENSORS

- A. Dual Technology sensors shall be capable of detecting presence in the control area by detecting doppler shifts in transmitted ultrasound and passive infrared heat changes.
- B. Sensor shall utilize Dual Sensing Verification Principle for coordination between ultrasonic and PIR technologies. Detection verification of both technologies must occur in order to activate lighting systems. Upon verification, detection by either shall hold lighting on.
- C. Sensor shall have a retrigger feature in which detection by either technology shall retrigger the lighting system on within 5 seconds of being switched off.
- D. Ultrasonic sensing shall be volumetric in coverage with a frequency of 40 KHz. It shall utilize Advanced Signal Processing which automatically adjusts the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
- E. Detection shall be maintained when a person of average size and weight moves only within or a maximum distance of 12 inches either in a horizontal or vertical manner at the approximate speed of 12 inches per second. The sum of this distance, volume and speed represent the average condition a dual technology sensor must meet in order for the lights to remain on when a person is reading or writing while seated at a desk.
- F. Sensor shall be capable of corner mounting to a wall or ceiling in order to eliminate detection through open doorways and outside of controlled area. To provide superior small motion detection and immediate activation upon entry, coverage of both technologies must be complete and overlapping throughout the controlled area.
- G. To avoid false ON activations and to provide high sensitivity to minor motion, Pulse Count Processing and Detection Signature Analysis shall be used to examine the frequency, duration and amplitude of a signal, to respond only to those signals caused by human motion.
- H. Sensor shall utilize mixed signal ASIC (application-specific integrated circuit) technology, which combines analog and digital processing into one chip package, to provide immunity to RFI and EMI.
- I. The PIR technology shall utilize a temperature compensated, dual element sensor and a multi-element Fresnel lens. The lens shall be Poly IR4 material to offer superior performance in the infrared wavelengths and filter short wavelength IR such as those emitted by the sun and other visible light sources. The lens shall have grooves facing in to avoid dust and residue build up which affects IR reception.
- J. To ensure high sensitivity to small motion at the desktop, the standard lens shall be 30 element with 15 layers horizontally and 4 layers vertically and shall cover up to 2000 square feet for walking motion when mounted at a ceiling height of 10 feet.

- K. For accuracy, sensor shall have a DIP switch controlled, digital time delay of 30 seconds to 30 minutes.
- L. Sensor shall have a DIP switch override-ON function for use in the event of a failure.
- M. Each sensing technology shall have an independent sensitivity adjustment and LED indicator that remains active at all times in order to verify detection within the area to be controlled.
- N. Sensor shall incorporate field-selectable logic configurations which allows for space utilization changes and/or other special field conditions.
- O. To ensure quality and reliability, sensor shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.
- P. Sensor shall have standard 5 year warranty and shall be UL listed.

2.4 PASSIVE INFRARED SENSOR

- A. The passive infrared sensor shall be capable of detecting presence in the control area, by detecting changes in the infrared energy. Small movements shall be detected such as when a person is writing while seated at a desk.
- B. To avoid false ON activations and to provide high sensitivity to minor motion, Pulse Count Processing and Detection Signature Analysis shall be used to examine the frequency, duration and amplitude of the signal received by the sensor to respond only to those signals caused by human motion.
- C. Sensor shall utilize mixed signal ASIC (application-specific integrated circuit) technology, which combines analog and digital processing into one chip package, to provide immunity to RFI and EMI.
- D. Sensor shall utilize a temperature compensated, dual element sensor and a multi-element Fresnel lens.
- E. Fresnel lens shall be a Poly IR 4 based material to offer superior filtering capability of competing light sources, such as the sun and other visible light sources. Lens shall have grooves facing in to avoid dust and residue build up which affects IR reception.
- F. Sensor shall have a 30 element Fresnel lens, 5 layers vertically and 6 layers horizontally, with a field of view of 110° vertically and horizontally.
- G. Sensor shall cover 300 square feet at normal mounting heights.
- H. Sensor shall have the ability to sense directly under and slightly behind sensor when mounted on ceiling.
- I. Sensor shall be capable of vertical or horizontal mounting with a 40 feet linear coverage in the vertical configuration. Mount on ceiling, or wall, as indicated on drawings.
- J. Time delay range shall be adjustable from 30 seconds to 30 minutes.
- K. Sensor shall have user-adjustable sensitivity setting.

- L. Sensor shall have in place a bypass pin which when removed will override sensor to ON and which requires no rewiring or modification to unit.
- M. Adjustments and mounting hardware shall be concealed under a removable cover to prevent tampering of adjustments and hardware.
- N. The sensor shall not protrude more than 1-1/4 inches from the ceiling (or wall) and should blend in aesthetically.
- O. Sensor shall be wired in parallel to allow coverage of large areas.
- P. To ensure quality and reliability, sensor shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.
- Q. Sensor shall have standard 5 year warranty.
- R. Sensor shall be UL listed.

2.5 PRODUCT APPLICATION

A. SMALL OFFICES OF AREAS 120 SQUARE FEET OR LESS:

- 1. Provide system based on passive infrared sensors, unless otherwise recommended by system manufacturer.

B. SPACES LARGER THAN 120 SQUARE FEET:

- 1. Provide system based on dual technology sensors. Provide auxiliary relays and additional sensors as required by size and configuration of the space.

C. TOILETS:

- 1. Use dual technology sensors. Provide auxiliary relay as required by application.

D. POWER SUPPLIES AND AUXILIARY RELAY MODULES:

- 1. Provide 120 and 277 volts A.C. to 24 VDC power supplies ("Power Packs") and auxiliary relay modules ("Slave Packs") as required to make occupancy sensor lighting control system operational.
- 2. Power packs consist of a transformer and high-current relay combined in one small, powerful package. The transformer of the power packs have a primary high voltage input of 120 or 277 volts, as applicable and a secondary 24VDC, 150 mA output. The secondary voltage provides operating power to the occupancy sensors. When the occupancy sensors detect motion, they electrically close an internal circuit which sends 24 VDC back to the power or slave packs which control the lighting systems.
- 3. Power packs shall have the following characteristics:
 - a. Secondary output of 150 mA.
 - b. UL rated 94 V-0 plastic enclosure; units are white.
 - c. Low voltage leads rated for 300 volts.
 - d. Size: 1.6" x 2.75" x 1.6" (41mm x 70mm x 41mm) with a ½ inch snap-in nipple
 - e. UL listing

- 4. Slave Packs: shall be similar to power packs except without power supply.
- 5. Both power packs and slave packs shall be suitable for installation in air plenum above ceiling spaces.

PART 3 - EXECUTION

3.1 CONTROL WIRING

- A. Control wiring between sensors and controls units shall be as recommended by system manufacturer, complying with Section 26 05 19, and run in metallic conduit.
- B. Minimum acceptable line voltage (120 or 277 volts circuits) wire gauge from the circuit control hardware relays shall be #12 AWG.

3.2 INSTALLATION

- A. It shall be the contractor's responsibility to locate and aim sensory in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
- B. It is the contractors' responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the owner's facility, to verify placement of sensors and installation criteria.
- C. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
- D. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control system.
- E. The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the scheduled commissioning date. Upon completion of the system fine tuning the factory authorized technician shall provide the proper training to the owner's personnel in the adjustment and maintenance of the sensors.
- F. Set sensors to turn off lights after the following delay upon sensing the absence of occupants in the space (verify settings with Owner prior to setting delays)
 - 1. Conference Rooms 15 Minutes
 - 2. Laboratories 20 Minutes
 - 3. Corridors 20 Minutes
 - 4. Group Offices 15 Minutes
 - 5. Lobbies 20 Minutes

March 23, 2020

University of North Carolina at Charlotte
Student Government Office Renovations
Contract Documents

113-10010-00
SCO ID# 18-18336-01A

- | | | |
|----|-----------------|------------|
| 6. | Lounge | 15 Minutes |
| 7. | Private Offices | 10 Minutes |
| 8. | Toilets | 30 Minutes |

G. Refer to Part 1 – General for required post-installation submittal.

END OF SECTION 26 09 25

SECTION 26 27 26 – WIRING DEVICES

PART 1 - GENERAL:

1.1 REFERENCE:

- A. Wiring devices shall be as indicated and as specified below. All devices shall be UL listed and comply with NEMA WD-1.

1.2 PART NUMBERS:

- A. Manufacturer's numbers listed are to establish a type and standard of quality. Any prefix and/or suffix, whether to be added or deleted to complete the number, shall be the Contractor's responsibility. This applies specifically but not exclusively to color identification, grade, and compliance with standards and specifications.

1.3 GRADE:

- A. Only the highest quality device in a category (single pole toggle, conventional duplex, etc.) will be acceptable. The addition or deletion of a prefix or suffix to change the device to a lower grade will not be acceptable.

1.4 COLOR:

- A. Unless indicated otherwise, color of 20 ampere devices shall be gray. Colors shall be that of the molding compound. Painting will not be acceptable.

1.5 WIRING:

- A. Unless noted SWO (side wired only), devices shall be back and side wired screw type terminals. Pigtails will not be acceptable unless noted otherwise.

1.6 GROUNDING:

- A. All devices shall be equipped with a "hex-head" green grounding screw for grounding the device to the grounding conductor run with the circuit conductors.

1.7 WIRING TEMPERATURE RATING:

- A. Each wiring device shall be UL listed for use with 75 degree C rated wire or higher.

1.8 MANUFACTURER:

- A. All devices shall be by a single manufacturer unless noted otherwise or not commercially available.
- B. Furnish manufacturer's data and literature for each item provided under this Section.

1.9 SAMPLES:

- A. Submit one non-returnable sample of each type receptacle and plate being installed in this building.

1.10 COVER PLATES:

- A. See Section 26 27 27.

PART 2 - PRODUCTS

2.1 SWITCHES:

- A. Switches shall comply with Federal Specification W-S-896 when commercially available.
- B. Toggle switches shall be single pole, three-way, or four-way as indicated on the drawings. Switches shall be of the grounding type, with hex-head grounding screw, rated 20A., 120/277 volt, AC only. Lighted handle switches shall have neon lights of the correct voltage rating where indicated on the drawings. All switches shall have quiet operating mechanisms without the use of mercury switches. All switches shall be listed by an "approved" third-party agency, approved for the voltage and amperage indicated.

Device	Manufacturer		
	Legrand	Hubbell	Cooper
Toggle, 1-pole	PS20AC1	HBL1221	
Toggle, 2-pole Lighted toggle, 1-pole	PA20AC2	HBL1222	
Toggle, 3-way	PZ20AC3	HBL123	

2.2 RECEPTACLES:

- A. Duplex receptacles shall be of the specification grade, grounding type, with nylon body arranged for back and side wiring, with separate single or double grounding terminals. Receptacles shall be straight blade, rated 20A, 125-volt and the face configuration shall conform to the NEMA Standard No. WDI.101968, and shall be "approved" third-party listed. Self-grounding or automatic type grounding receptacles are not acceptable in lieu of receptacles with separate

grounding screw lugs and a direct, green insulated conductor connection to the equipment grounding system.

- B. Receptacles that are to be installed in wet locations shall be listed as suitable for installation in such environment.
- C. Special Devices:
 - 1. Provide NEMA 5-20R duplex GFI receptacle for any application where the receptacle is within 6 feet of a sink and as otherwise noted on drawings. GFI shall comply with January 1, 2003 UL943 Revisions. SafeLock™ Protection: If critical components are damaged and ground fault protection is lost, power to receptacle is disconnected.

<u>NEMA CONFIGURATION</u>	<u>Legrand</u>	<u>HUBBELL</u>	<u>Cooper</u>
5-20R	5362	5362	5362

2.3 WIRING DEVICE PLATES:

- A. Except as otherwise noted, cover plates for wiring devices shall be “302” stainless steel.
- B. Spare Devices: Provide 2% of spare plates of each kind used.
- C. Cover plates for normal power circuits in unfinished equipment rooms shall be Type 302 stainless steel, .040" thick, satin finish, smooth surface.
- D. Coverplate mounting screws shall be slotted head oval screws and shall match the finish and material of the plate, and shall be furnished with the plate by the plate manufacturer.
- E. Manufacturer: Coverplate shall be manufactured by Pass & Seymour, Hubbell, Sierra, or Bryant unless noted otherwise.
- F. Switch and receptacle coverplates on exposed work shall be galvanized cast ferrous metal or Feraloy, standard size, and shall be single or ganged as indicated on the drawings.

PART 3 - EXECUTION

3.1 ORIENTATION OF RECEPTACLES:

- A. Receptacles shall be mounted vertically. Receptacles mounted over counters, back-splashes, etc., shall be mounted horizontally.
- B. All vertically mounted receptacles shall be mounted with the ground slot up.

3.2 RECEPTACLE LABELING:

- A. Each receptacle, in other than public lobbies and public areas shall have a permanent label indicating circuit and panel number.

END OF SECTION 26 27 26

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SECTION 26 27 27 – COVER PLATES

PART 1 - GENERAL

1.1 GENERAL:

- A. Provide coverplate on each outlet and on each wiring device.
- B. Coverplates shall accommodate the devices installed in the outlet boxes. Where more than 1 device is indicated at the same location, a multiple ganged plate shall be used. All coverplates shall be provided by the Contractor.
- C. Plates shall be compatible with the device configuration.
- D. Coverplates shall be UL listed and shall comply with Federal Specification W-P-455 and NEMA WD-1.
- E. All coverplates over flush wall boxes shall meet flush with wall.
- F. All coverplates shall be manufactured by a single manufacturer unless noted otherwise or not commercially available.
- G. Furnish manufacturer's data and literature for each item provided under this section.

PART 2 - PRODUCTS:

2.1 WIRING DEVICE PLATES:

- A. Cover plates, for other than wiring devices on surface raceways, shall be Type 302 stainless steel, .040" thick, satin finish, smooth surface. Coverplates for wiring devices that are part of surface raceways shall match raceway finish.
- B. Coverplate mounting screws shall be slotted head oval screws and shall match the finish and material of the plate, and shall be furnished with the plate by the plate manufacturer.
- C. Manufacturer: Coverplate shall be manufactured by Hubbell, Sierra, P&S or Arrow-Hart unless noted otherwise.

2.2 SPARE PLATES:

- A. Provide 2% of plates of each type used, but not less than one (1), at end of project and turn over to Owner.

END OF SECTION 26 27 27

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SECTION 26 51 00 - BUILDING LUMINAIRES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Lighting fixture supports.

1.2 RELATED SECTIONS

- A. Section 26 05 19 - Building Wire and Cable.
- B. Section 26 05 29 – Hangers and Supports for Electrical Systems.
- C. Section 26 05 53 - Electrical Identification.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM A 580/A 580M – Standard Specification for Stainless Steel Wire
2. ASTM A641 / A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

B. Code of Federal Regulations (CFR)

1. 47 CFR 18 – Telecommunications, Industrial, Scientific, and Medical Equipment

C. Institute of Electrical and Electronic Engineers (IEEE)

1. IEEE C62.41.1 – Guide on the Surge Environment in Low-Voltage (1000 Volts and Less) AC Power Circuits
2. IEEE C62.41.2 – Recommended Practices on Characterization of Surges in Low-Voltage (1000 Volts and Less) AC Power Circuits

D. Department of Defense Interface Standard – Military Standard (MIL-STD)

1. MIL-STD-461E – Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

E. National Electrical Manufacturers Association (NEMA)

1. NEMA LE 4 – Recessed Luminaires, Ceiling Compatibility
2. NEMA LE 6 – Procedure for Determining Target Efficacy Ratings (TER) for Commercial, Industrial and Residential Luminaires

F. National Fire Protection Association (NFPA)

1. NFPA 70 – National Electrical Code
2. NFPA 101 – Life Safety Code

G. Underwriters Laboratories (UL)

1. UL 1598 – Luminaires

H. Definitions

1. BF: Ballast factor.
2. CCT: Correlated color temperature.
3. CRI: Color-rendering index.
4. HID: High-intensity discharge.
5. LER: Luminaire efficacy rating.
6. Lumen: Measured output of lamp and luminaire, or both.
7. Luminaire: Complete lighting fixture, including ballast housing if provided.
8. IESNA: Illuminating Engineering Society of North America

1.4 SUBMITTALS

A. Action Submittals

1. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - a. Physical description of lighting fixture including dimensions.
 - b. Energy-efficiency data.
 - c. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
 - d. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - 1) Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
 - 2) Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
2. Shop Drawings: For nonstandard or custom lighting fixtures. Include plans, elevations, sections, details, and attachments to other Work.
 - a. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - b. Wiring Diagrams: For power, signal, and control wiring.

3. Installation instructions

B. Informational Submittals

1. Qualification Data: For qualified agencies providing photometric data for lighting fixtures.

2. Product Certificates: For each type of ballast.
3. Field quality-control reports.
4. Warranty: Sample of special warranty.

C. Closeout Submittals

1. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
 - a. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

D. Spare Parts / Maintenance Material Requirements:

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - a. Lamps: 10% of each type and rating installed. Furnish at least one of each type.
 - b. Plastic Diffusers and Lenses: 10% of each type and rating installed. Furnish at least one of each type.
 - c. Ballasts and LED drivers and LED light bars: 1% of each type and rating installed. Furnish at least two of each type.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

1.6 WARRANTY

- A. Warranty for products specified here shall be in accordance with the requirements stated in the General Condition and Supplementary Conditions of the Contract.
- B. Special Warranties: Manufacturer's standard form in which manufacturer of specified lighting unit agrees to repair or replace components of such lighting unit that fail in materials or workmanship within specified warranty period.
 1. Warranty period for LED Lighting Fixtures: Manufacturer and luminaire distributor agree to repair or replace LED luminaires that fail during the warranty period as qualified here:
 - a. The requested warranty for LED array and driver is a full 5-year warranty for parts and labor from the date of building final acceptance by State Construction Office.
 - b. Warranty for fixture paint, lens, de-coloration or corrosion is three years from the date of substantial completion.
 - c. The warranty for LED luminaires is a full warranty. The warranty is for an installation as defined by the Contract Documents for this specific building.

- d. The method of switching used for the LED luminaires shall not reduce in any way the required 5-year warranty. The switching method is as shown on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide one of the projects indicated on the drawings.

B. General Requirements for Lighting Fixtures and Components

1. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
2. LED Fixtures: Comply with UL 1598. Where LED is specified, test according to NEMA LE 6.
3. Metal Parts: Free of burrs and sharp corners and edges.
4. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
5. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
6. Diffusers and Globes:
 - a. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 1) Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
 - 2) UV stabilized.
 - b. Glass: Annealed crystal glass unless otherwise indicated.

C. LED Luminaire Requirements

1. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Lumen Maintenance: Comply with IES Standard LM 80.
3. Lumen Output: Rated values measured in compliance with IES Standard TM21.
4. Recessed Fixtures: Comply with NEMA LE 4.
5. Bulb shape complying with ANSI C79.1.
6. Lamp base complying with ANSI C81.61.
7. CRI of minimum 85. CCT of 3000K.
8. Rated lamp life of 50,000 hours.
9. Lamps dimmable from 100 percent to 0 percent of maximum light output.

10. Modular driver. LED fixtures shall be constructed to allow for separate replacement of LED driver and LED arrays.
11. Nominal Operating Voltage: 120V through 277V ac.
 - a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
12. Housings:
 - a. Die cast aluminum housing and heating sink.

D. Lighting Fixture Support Components

1. Comply with Section 26 05 29- "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
2. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
3. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
4. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
5. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
6. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
7. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

2.2 STAND-ALONE, MODULAR DIMMING CONTROLS

A. Section Includes:

1. Wall-box dimming controls.

B. Definitions

1. Fade Rate: The time it takes each zone to arrive at the next scene, dependent on the degree of change in lighting level.
2. Low Voltage: As defined in NFPA 70, the term for circuits and equipment operating at less than 50 V or for remote-control, signaling, and power-limited circuits.

C. Action Submittals

1. Product Data: For each type of product.
 - a. For wall box dimming controls; include elevation, dimensions, features, characteristics, ratings, and labels.
 - b. Device plates and plate color and material.
 - c. LED luminaires compatible with dimmers.
2. Shop Drawings:
 - a. Include diagrams for power, signal, and control wiring.
3. Samples for Initial Selection: Faceplates with factory-applied color finishes and technical features.

D. Informational Submittals

1. Field quality-control reports.

E. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Lutron Electronics Co., Inc.
2. Creston
3. N-Light

4. Hubbell
 5. Or approved equivalent.
- F. General Dimming Device Requirements
1. Compatibility:
 - a. Dimming control components shall be compatible with lighting fixtures, LED drivers, and transformers.
 2. Dimmers and Dimmer Modules: Comply with UL 508.
 - a. Audible Noise and Radio-Frequency Interference Suppression: Solid-state dimmers shall operate smoothly over their operating ranges without audible lamp or dimmer noise or radio-frequency interference. Modules shall include integral or external filters to suppress audible noise and radio-frequency interference.
 - b. Dimmer or Dimmer-Module Rating: Not less than 125 percent of connected load unless otherwise indicated.
 3. Surge Protection: Withstand supply power surges without impairment to performance.
 - a. Panels: 6000 V, 3000 A, complying with IEEE C62.41.1 and IEEE C62.41.2.
 - b. Other System Devices: 6000 V, 3000 A, complying with IEEE C62.41.1 and IEEE C62.41.2.
 4. Off Control Position: User-selected off position of any control point shall disconnect the load from line supply.
- G. System Description
1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Comply with NFPA 70.
- H. Wall-Box Dimming Controls
1. Description: Factory-fabricated equipment providing manual dimming consisting of a wall-box-mounted controller, as applicable. Controls and dimmers shall be integrated for mounting in wall box under a single wall plate.
 2. Each zone shall be configurable to control the following loads:
 - a. LED luminaires.
 3. Dimmers: Regulate voltages to maintain a constant light level, with no visible flicker, when the source voltage varies plus or minus 2 percent rms.
 4. Memory:
 - a. Retain preset scenes and fade rates through momentary (up to 3-second) power interruptions.
 - b. Retain preset scenes through power failures for at least seven days.
 5. Device Plates: Style, material, and color shall comply with Section 26 27 26 "Wiring Devices." Master-control cover plate shall be one piece.
- I. Conductors and Cables
1. Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Building Wire and Cable."
 2. Class 2 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Building Wire and Cable."
- J. Wiring Installation
1. Comply with NECA 1.
 2. Wiring Method: Comply with requirements in Section 26 05 19 "Building Wire and Cable." Minimum conduit size shall be 1/2 inch.

3. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
 4. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
 5. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
- K. Identification
1. Comply with requirements in Section 26 05 53 "Electrical Identification" for identifying components and power and control wiring.
 2. Label each dimmer module with a unique designation.
 3. Label each scene control button with approved scene description.
- L. Field Quality Control
1. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
 2. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - a. Continuity tests of circuits.
 - b. Operational Test: Set and operate controls to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions.
 - 1) Include testing of modular dimming control equipment under conditions that simulate actual operational conditions. Record control settings, operations, cues, and functional observations.
 3. Remove and replace malfunctioning modular dimming control components and retest as specified above.
 4. Test Labeling: After satisfactory completion of tests and inspections, apply a label to tested components indicating test results, date, and responsible agency and representative.
 5. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.
- M. Demonstration / Training
1. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain modular dimming controls. Laptop portable computer shall be used in training.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

3.2 INSTALLATION

A. Lighting Fixtures

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Owner's Representative, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Lay-in Ceiling Lighting Fixtures Supports:

1. Where a lighting fixture replaces ceiling tile in lay-in ceilings, support fixture with minimum of two support wires, one at opposite corner of fixture and secure fixture to ceiling grid main runners with sheet metal screw at each corner of the fixture. It is the responsibility of the Division 26 Contractor to arrange with the ceiling installer for the proper location of ceiling grid main runners to accomplish fixture attachments.
2. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
3. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

D. Suspended Lighting Fixture Support

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

E. Connect wiring according to Section 26 05 19 – "Building Wire and Cable."

F. Identification

1. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 26 05 53 – "Electrical Identification."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

1. Record emergency battery voltage at start of test and after 90-minutes. Alternatively, contractor shall measure foot-candle levels of emergency lighting at start of test and end of test. Include test results in report at SCO final inspection.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.
- C. Adjusting
 1. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this Work may be required after dark.
 - a. Adjust aimable luminaires in the presence of Owner's Representative.

END OF SECTION 26 51 00

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SECTION 26 90 00 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RECORD DRAWINGS

- A. The Electrical contractor shall keep a record copy of the bid set and fabrication drawings at the job site and shall accurately maintain a record with dimensions and elevations of all changes to the contract drawings as the job progresses. At the completion of the job, the electrical contractor shall obtain a sepia reproducible from the Engineer and shall make changes which occurred during construction on drawings and submit three (3) copies to the Engineer. The Engineer will check drawings and will return them to contractor with comments or statement of approval, as applicable. Record drawings shall be submitted to the Engineer within 15 days of project acceptance.

1.2 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS:

- A. After installation has been completed, equipment has been tested, systems placed in permanent operation, and all adjustments made, a competent start-up technician shall be provided for a period of two working days. This technician shall operate the systems during this time, and during this time shall instruct the Owner's designated representatives in the operation and maintenance of the equipment. The start-up technician shall be at the site continuously during working hours during the instructional period.
- B. Operating and Maintenance Manuals: See Section 26 01 00.

1.3 WARRANTIES:

- A. Deliver to Owner all warranties, guarantees, extended service agreements, etc. and obtain written receipts.

1.4 PUNCH LIST:

- A. During construction period the A/E will issue punch lists. These items shall be completed before Engineer will approve next application for payment. Final punch list work shall be completed before acceptance.

1.5 FINAL INSPECTION AND ACCEPTANCE:

- A. The Architect or his authorized representative will entertain the request for final inspection and acceptance only after the following items are done.
 - 1. Submit a list of uncompleted items, if any, and advise when the items will be done.
 - 2. Complete all items on A/E's pre-final punch list.

1.6 FINAL CLEAN UP:

- A. During construction this contractor shall keep the site clear of debris and upon completion of construction he shall clean up the premises and to remove all evidence of his work.
- B. The contractor shall resolve all questionable items to be corrected prior to an inspection by the A/E. If items have not been corrected completely, and additional site visits are required for the A/E to check for compliance, the contractor will be billed by the Owner at \$100.00 per hour plus travel expenses for A/E's services.

1.7 GUARANTEE:

- A. The guarantee shall be as stated in the General Conditions, and the General Provisions of this section.

END OF SECTION 26 90 00

SECTION 28 31 11 – FIRE ALARM AND SMOKE DETECTION SYSTEMS

PART 1 - GENERAL

1.1 GENERAL

- A. Furnish and install as shown on the drawings and described in these specifications all necessary parts, connections and programming required for additions and modifications to the existing addressable fire alarm and smoke detection system. The work shall meet all applicable requirements of the current NC Building Code and NFPA 72 as well as compliance with the 2010 ADA Standards. All components shall comply with the requirements of the State of North Carolina Accessibility Code.
- B. All materials used shall be UL, CSA, or ETL listed and labeled.
- C. All fire alarm devices shall be UL listed compatible with the Fire Alarm Control Unit (FACU) and manufactured by same manufacturer as the FACU. The complete fire alarm system shall meet UL certification as installed.
- D. All work must comply with NEC, NFPA and NC DoI specifications and guidelines.
- E. This specification contains the requirements by State of North Carolina Department of Administration State Construction Office "Fire Alarm Guidelines and Policies 2011".

1.2 QUALITY ASSURANCE

- A. All referenced manufacturer's requirements and specifications and nationally recognized and accepted standards and specifications shall be the latest edition unless specified otherwise and shall be used as they are applicable for products and craftsmanship incorporated in the Contract Drawings and this Section only. The references to these standards and specifications do not imply acceptance of any and all products described in the standards and specifications.
- B. The contractor, through the manufacturer of the equipment specified here, shall review the use, details, and methods of installation of his product as indicated and shall disclose to the Architect any and all deviations from his recommended use and method of installation and shall also disclose to the Architect his recommendations for the use and method of installation of his product to achieve the intended purpose and result. Such disclosure shall be made within the time stipulated for submission of shop drawings.

1.3 WORK INCLUDED

- A. Additions to the existing fire alarm systems shall include, but not be limited to, the following items:
 - 1. Addressable analog smoke detectors.
 - 2. Addressable analog photoelectric duct detectors.
 - 3. Addressable thermal sensors.
 - 4. Addressable manual alarm stations.
 - 5. Audio, visual and audio-visual alarm appliances as required to satisfy codes.

6. All required modules, relays, interfaces and wiring in conduit to accomplish the additions of the above.

1.4 SHOP DRAWINGS

- A. The contractor shall not use a copy of electrical design drawings to submit fire alarm system shop drawings. Fire alarm floor plan shop drawings shall be prepared utilizing architectural floor plans with symbols representing fire alarm system components and indicating specific conduit routing.
- B. Submit complete shop drawings to the engineer for review, prior to performing any work. These shall clearly demonstrate compliance with the engineer's plans and specifications. Any non-compliant features must be prominently identified and fully described. Engineer's approval (with or without corrections) of contractor's shop drawings, sample cut sheets, etc. is for general conformance with the contract documents and design concept. It shall not relieve the contractor of responsibility for full compliance with the project plans and specifications, except for any specific non-compliant features for which the engineer gives written authorization.
- C. Include a copy of system battery sizing calculations with the shop drawing submittal. Use manufacturer's battery discharge curve to determine expected battery voltage after 24 hours of providing standby power. Then use calculated Notification Appliance Circuit current draw in the alarm mode to determine expected voltage drop at EOL, based on conductor resistance per manufacturer's data sheet. In the calculation, double the ohms per foot since two conductors are required to power the circuit. Also, add any inherent voltage drop caused by the system's power supply.
- D. The voltage drop at EOL must not exceed 14% of the expected battery voltage, after the required standby time plus alarm time. Determine "worst case" voltage at far end of each NAC, by subtracting its calculated V-drop from the expected battery voltage. The result must be no less than the minimum listed operating voltage for the alarm notification appliances used.
- E. All of these calculations must be placed on a dedicated sheet of as-built drawings, for future reference by fire alarm service technicians. NAC voltage drop is to be verified during system tests.

1.5 WARRANTY AND PREVENTIVE MAINTENANCE REQUIREMENTS

- A. Components shall have a 12 month warranty period.
- B. During the 12 month warranty period, one annual preventive maintenance (PM) inspection/test shall be performed on the fire alarm system components by the contractor. This PM is to be performed 6 months or more after University acceptance of system. The system acceptance test, punch list items do not meet this requirement. All system deficiencies found shall be documented and corrected during this PM. All parts and repairs shall be covered under the system warranty.
- C. This PM shall be scheduled through the Engineer/Designer and coordinated through the University campus liaison. A report consisting of the NFPA Inspection and Testing Form shall be furnished by the contractor, to the engineer and the UNC Charlotte Facilities Management group within 2 days after completion of this PM. The NFPA Inspection and Testing Form can be found on page 72-111, of NFPA 72, latest edition.

- D. Any replacement of parts required because of defects of normal operation of the system during the guarantee period shall be rendered at no cost to the owner.
- E. Personnel Instructions:
1. Refer to requirements stated in Part 3 – Execution.
 2. Posting of Construction Record Drawings and Graphic Drawings:
 3. Refer to Part 3 - Execution
- F. Testing:
1. The system shall be tested as described in Part 3 - Execution
 2. After successful completion of the inspection and tests, the warranty period shall begin. In the event of any system malfunctions or nuisance alarms, the contractor shall take appropriate corrective action.
- G. General Requirements for Addressable Fire Alarm Systems:
1. Authority Having Jurisdiction (AHJ): The AHJ for Code compliance of all State-owned facilities is the North Carolina Department of Administration, State Construction Office (919-807-4100). The AHJ for construction administration and inspection purposes is State Construction Office and the University, as represented by the architect-engineer.
 2. Fire alarm system installer (technician) shall be trained and certified by the manufacturer of both existing systems and for the model and series of each. This training and certification must have occurred within the most recent 24 months.
 3. Approval of samples, cut sheets, shop drawings, and other matter submitted by the contractor shall not relieve the contractor's responsibility for full compliance with project plans and specifications, unless the attention of the electrical design engineer is called to each non-complying feature by accompanying letter, and the engineer subsequently gives written authorization for the specific deviation(s).
 4. The Contractor shall furnish all parts, materials, and labor required for a complete and operating system in accordance with all applicable requirements, even if each needed item is not specifically shown or described in the project plans or specifications.
 5. All equipment supplied must be specifically listed for its intended use, and installed in accordance with any instructions included in its listing.
 6. All control equipment locations, including any transponders, sub-panels, and booster power supplies, shall be protected by a spot type smoke detector located within 15 feet of the equipment (measured horizontally).

PART 2 - PRODUCTS:

2.1 GENERAL

- A. The existing fire alarm system shall be altered and expanded as required to comply with the NCSBC 2018 and to fit remodeled spaces.

- B. Each device on an addressable initiating circuit shall be checked continuously for sensitivity, response, opens, shorts, ground faults, functionality and status.

2.2 SYSTEM ALARM OPERATION

- A. Strobe lights shall be selected and located per NFPA 72 and all those installed in a single space must be synchronized.
- B. Alarm notification appliance (NAC) circuits shall be NFPA 72 Style Y (Class B). The load connected to each circuit must not exceed 80% of rated module output and the coverage of each circuit shall not exceed 3 floors (to limit the effect of faults, and to facilitate trouble shooting). The NAC voltage drop during alarm shall not exceed 14% of the voltage measured across the batteries at that time. To achieve this, the design must consider wire size, length of circuit, device load, inherent voltage loss within the FACU's power supply, etc. The contractor shall use power outage testing to verify that the NAC circuit was designed and installed properly.
- C. Basically the system shall alarm as follows:
 - 1. The actuation of any smoke detector, pull station, fire detector or flow switch shall:
 - 2. Provide instant notification in the fire control panel with visual display and audible signal.
 - 3. Sound the fire alarm in the building and activate one-way emergency voice communication system.
 - a. Automatic shut-down of air handling system shall occur when system duct detector goes into alarm, or when detector within the fan system air zone goes into alarm.
 - b. Sound audible alarm and flash all visual alarm devices in the building.
 - c. Perform any additional function as specified herein or as shown on the plans.
- D. Detector Selection:
 - 1. Fire/smoke detectors used shall be selected in accordance with the Applications Matrix for Detection Devices, which is shown at the end of this section.
- E. Fan Shutdown: Shall be accomplished from the FACU or utilizing built-in relays.
- F. Fire Alarm Devices and Appliances:
 - 1. Provide all the necessary devices for a complete system. Devices shall be provided with suitable back boxes and shall be flush or semi-flush mounted. All devices shall match the brand of FACU installed and these devices shall be addressable analog devices.
 - 2. Appliances, both visual type and audible type, shall be provided as required to meet the requirements of NFPA 72, State Building Code and ADA. The quantity, location, and intensity of the alarm appliances actually provided shall be not less of what is shown on drawings but supplemented and adjusted to meet stated standards without additional charge to the Owner or its agents.
- G. Manual Pull Stations: Addressable type, dual action type. Provide suitable back box. All pull stations shall have keyed locks for resetting purposes. Stations shall not be resettable to normal without the use of a key.

- H. Isolator Module: Provide so that not more than 25 initiating devices are grouped together in between isolation modules or between loop interface board and isolator module. No matter how many devices are placed between isolators, under no circumstances shall 80% capacity of the manufacturer's requirements be exceeded between isolators. Isolators shall be mounted at same height above floor as audible/visual appliances, in a flush-in-wall box. (Box may be surface mounted in equipment rooms.)
- I. Control Module: Use as required for AHU shutdown. Install as part of FACU or in matching cabinet adjacent to FACU. Control modules shall have N.O. and N.C. auxiliary relay contacts rated 2.0 amperes at 120 volts, 60 HZ.
- J. Alarm Horns: Provide alarm horns, as applicable, to satisfy current NC State Building Code, NFPA 72 and ADA requirements for building. Horns shall be electronic, with white grille plate, suitable for flush mounting. Horns shall operate a 24 VDC and shall have a rated output as required to meet both DOI and ADA requirements. Horns shall be provided in quantity and intensity as required to provide 15 dBA of alarm sound over the normal ambient sound level in all occupiable areas of the building.
- K. Visual Appliances: Visual signals shall be strobe light units complying with NC State Building Code and ADA. The housing shall be white. Flashing light units shall be wall mounted. Provide back box. Indoor strobe lights shall flash 60-120 times/minute. Outside strobes shall have a 100 candela output, or higher, double flash, clear lens. Strobe lights within common spaces shall be synchronized.

2.3 SMOKE DETECTOR APPLICATION AND INSTALLATION

- A. All addressable spot type and duct smoke detectors shall be the analog type and the alarm system shall automatically compensate for detector sensitivity changes due to ambient conditions and dust build-up within detectors. This feature shall be armed and sensitivities set prior to acceptance of the system.
- B. Spot-type detectors shall be the plug-in type, with a separate base (not a mounting ring), to facilitate their replacement and maintenance. The base shall have integral terminal strips for circuit connections, rather than wire pigtails. Each detector or detector base shall incorporate an LED to indicate alarm.
- C. Spot-type smoke detectors shall have a built-in locking device to secure the head to the base, for tamper resistance. For detectors mounted within 12 feet of the floor, activate this lock after the system has been inspected and given final acceptance.
- D. Unless suitably protected against dust, paint, etc., spot type smoke detectors shall not be installed until the final construction clean-up has been completed. In the event of contamination during construction, the detectors shall be replaced with new detectors at no additional cost to the owner.
- E. NOTE: Covers supplied with smoke detector heads do not provide protection against heavy construction dust or spray painting. These covers are suitable only during final, minor cleanup or touch up operations.
- F. Contractor shall provide identification of each individual detector. Assign each a unique number as follows, in sequence starting at the FACU: (Addressable Loop #, -- Device #). Put on the as-built plans, and also permanently mount on each detector's base so that it's readable standing on the floor below without having to remove the smoke detector, except that for detectors with

housings (i.e., air duct, projected beam, air sampling, flame), apply the identification to a suitable location on exterior of their housing.

- G. All smoke detectors shall have magnet test capability if available for installed system.

2.4 CEILING (Spot) SMOKE DETECTORS

- A. Ionization Detectors: Unipolar dual chamber type, intelligent unit, with analog detection reporting capabilities and addressable functions. Detector shall be listed under UL-268 and shall be approved by DOI. Detector shall be sealed against dirt, bugs and back pressure. Color shall be off-white. Detector shall have remote LED output connection contacts.
- B. Photoelectric Detectors: Optical sensing chamber, intelligent unit, with analog detection reporting capabilities and addressable functions. Other features just like ionization detector.
- C. Remote Alarm Indicator Light System (RAILS) for smoke detectors in non-occupied areas shall be used complying with applicable codes.

2.5 CEILING (Spot) THERMAL DETECTORS

- A. Thermal Detectors: Thermal Detectors shall be intelligent addressable devices rated at 135°F (58°C) and shall have a rate-of-rise element rated at 15° F. (9.4°C) per minute. Thermal detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements.

2.6 DUCT MOUNTED SMOKE DETECTORS:

- A. Addressable duct detectors shall be furnished and wired by the electrical contractor, installed in ductwork by the mechanical contractor. The electrical contractor shall furnish detector housing and sample tubes. Automatic duct smoke detectors shall be photoelectric. The duct housing assembly shall be airtight and provide a visible means of monitoring the light-emitting diode through the assembly. A sampling tube of the appropriate length shall be provided for each installation. Each duct detector installation shall have a hinged or latched duct access panel, 12x12 inches minimum, for sampling tube inspection and cleaning sampling tube shall have holes facing into air stream. Contractor shall provide indication of airflow direction on the duct, adjacent to the detector. The number of detectors required for the proper monitoring of the duct or plenum shall be provided in accordance with NFPA-72, regardless of what is shown on drawings. The duct smoke detector symbol shown on drawings is only to identify the approximate locations where duct smoke detection is required. The actual quantity and placement of the duct detectors shall be as required to satisfy NFPA-72 requirements in accordance with the size of the air duct and its configuration, all to be provided as part of the original contract without extra cost to the Owner. Energization of a duct smoke detector shall shutdown fan and energize fire alarm. Fan shutdown shall be accomplished from relays in the main control panel and wired in such manner as to supervise wiring from FACU to AHU control.
- B. All air duct/plenum detectors shall have a Remote Alarm Indicator Lamp (RAIL) with a test switch (which shall be mounted 8'-0" AFF) installed in the nearest corridor or public area and identified by an engraved label affixed to the wall or ceiling. Duct smoke detectors are permitted to be installed only inside an air duct. Duct detectors shall also be installed in a manner that provides suitable, convenient access for required periodic cleaning and calibration.

- C. Duct detector sampling tubes shall extend the full width of the duct. Those over 36 inches long shall be provided with far end support.
- D. Building Automation Systems shall not be used for alarm shut downs of air handling systems.

PART 3 - EXECUTION:

3.1 GENERAL

- A. The Fire Alarm contractor shall provide any special equipment, tools and programming devices required in the operation, maintenance or repair of the installed fire alarm system.

3.2 SERVICES AND PRECAUTIONS DURING CONSTRUCTION

- A. Contractor is responsible for maintaining fire alarm and smoke detection system coverage during construction. Contractor is responsible for assuring that the existing fire alarm and smoke detection system components in or near the construction area are protected during construction and left in operating conditions after work is finished. Comply with requirements of **2018** NC State Fire Code Chapter 14 – “Fire Safety During Construction and Demolition” and those prescribed by the University’s designated Fire Marshal and University Safety Officer.
- B. Fire alarm system and smoke detection coverage in both buildings shall be maintained at all times except as otherwise approved by Fire Marshal.
- C. Fire alarm system and smoke detection coverage within or adjacent to the area of construction shall be maintained at all times except when the Fire Marshal approves the implementation of equivalent coverage, such as fire watch.
- D. Provide temporary dust and construction protection on any fire alarm system, alarm initiating device or alarm appliance that has been rendered inoperative during construction period as approved by the Fire Marshal. Clean any existing fire alarm system remaining device and appliance within, and adjacent to, the area of construction as recommended by system manufacturer. Test each such fire alarm system device and appliance prior to re-energization.
- E. Verify integrity of existing fire alarm system circuits in, or adjacent to, the area of construction. Conduct comprehensive fire alarm system tests per NFPA 72 at the end of the project to verify that the existing fire alarm system, as modified and expanded during construction, has withstood the construction process without damage and operates as intended.

3.3 DETECTOR LOCATION

- A. Detector shall be generally as shown on drawings, except that final locations shall be adjusted in the field as required to clear obstructions and to provide maximum area protection in keeping with NFPA 72. All detectors shall be installed in accordance with manufacturer’s recommendations. For detectors located in or on ceilings, the locations shown on the drawings are tentative according to other ceiling mounted equipment. Coordinate among trades to avoid access doors, sprinkler heads, etc., and to determine exact locations of detectors. Adjust location of detectors to be at least 3’-0 away from air diffuser. Duct smoke detectors shall be located in strict accordance with NFPA 72 requirements. The specific location shown on drawings is only symbolic.

3.4 SYSTEM CONFIGURATION AND INSTALLATION

- A. Signaling line circuits (SLC, also called addressable loops) shall be NFPA Style 6 (Class "A"), with no "T" taps.
- B. All fire alarm system wiring shall be in metal conduit.
- C. There shall be no splices in the system other than at device terminal blocks, or on terminal blocks in cabinets. "Wire nuts" and crimp splices shall NOT be permitted. Permanent wire markers shall be used to identify all connections at the FACU and other control equipment, at power supplies, and in terminal cabinets.
- D. Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low capacitance, twisted shielded copper pair. Cable shield drain wires are to be connected at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACU. Acceptable cables include Atlas 228-18-1-1STP, BSCC S1802s19 (same as EEC 7806LC), West Penn D975, D991 (AWG 16), D995 (AWG 14), or equal wire having capacitance of 30pf/ft. maximum between conductors. Belden 5320FJ is acceptable if only FPL rating is needed. The cable jacket color shall be red, with red (+) and black (-) conductor insulation.
- E. EXCEPTION #1: Unshielded cable, otherwise equal to the above, is permitted to be used where the manufacturer's installation manual requires, or states, preference for, unshielded cable3
- F. Except as previously specified all other circuits in the system shall be wired with THHN/THWN conductors, installed in conduit. Color code them as indicated below throughout the system, without color change in any wire run:
1. Alarm notification Appliance Circuits (horns and strobes).....Blue (+)/Black (-)
 2. Separate 24vdc Operating Power (for system equipment).....Yellow (+)/Brown (-)
 3. Door Control Circuits (magnet power, if from system).....Orange
 4. Circuits from 2AM to monitored devices (AWG 14/16).....Violet (+)/Grey (-)
- G. Notification Appliance Circuit booster ("ADA") power supplies shall be individually monitored by the FACU and protected by a smoke detector per NFPA-72. They shall not be located above a ceiling, or in non-conditioned space. Any 24vdc power circuits serving addressable control relays shall also be monitored for integrity.
- H. All junction boxes shall be painted red prior to pulling the wire. Those installed in finished areas are permitted to be painted outside to match the finish color.
- I. When field addressable modules are located in junction boxes, the junction box covers must be labeled as to their contents (EG 3-24 Sprinkler Monitor).
- J. Contractor shall label all wires terminating in junction boxes and riser boxes. These labels shall be self-sticking wire numbers or similar type. Write on labels are prohibited. Contractor shall provide a typed legend for all junction boxes and riser boxes corresponding to these labels. Legend is to be mounted in fire alarm terminal wiring cabinet. If system does not have riser cabinets provide legend to the University representative at acceptance of system installation.
- K. On conventional systems (I.E. not addressable) all initiating devices shall be labeled with their respective zone and sequence number.

- L. On addressable systems all initiating devices and modules shall be labeled with their respective addresses, including loop and point number.
- M. All device labels shall be made using an electronic labeling system with black letters on white background. Write-on labels are prohibited.

3.5 PROGRAMMING, TESTING AND CERTIFICATION

- A. All connections to the FACU, and the system's programming, shall be done only by the manufacturer, or by an authorized distributor that stocks a full complement of spare parts for the system. The technicians who do this are required to be trained and individually certified by the manufacturer, for the FACU model/services being installed. This training must have occurred within the most recent 24-months. Copies of their certifications must be part of the shop drawing submittal to the engineer, prior to installation. The submittal shall not be approved without this information.
- B. When programming the system, activate the automatic drift compensation feature for all spot-type smoke detectors. Whether or not to activate the alarm verification feature for such detectors is to be determined by the design engineer/Owner's representative at that time. In the absence of clear guidance on the latter, do not activate alarm verification.
- C. Set spot-type smoke detector sensitivities to normal/medium, unless directed otherwise by the design engineer/Owner's representative.
- D. Print a complete System Status and Programming Report after the above steps have been done. This must include the program settings for each alarm initiating device and the current sensitivity of each analog addressable smoke detector.
- E. Upon completion of the installation, the fire alarm technician shall test 100% of new and relocated devices plus a random test of 10% of the existing devices. Also, in coordination with the other building system contractors, all other system functions shall be verified by the electrical contractor and the fire alarm technician, including (where applicable) elevator capture and the control of HVAC systems, door locks, pressurization (or smoke purge) fans, fire or smoke doors/dampers/shutters, etc. The engineer must be notified in advance of these tests, to permit them to be witnessed, if desired.
- F. The contractor shall submit the following documentation to the owner, through the engineer, prior to the AHJ's system acceptance inspection:
 - 1. The NFPA 72, Figure 7.8.2(a), "System Record of Completion" form. Use this form (no substitutes) to detail the system installation and also to certify that: (a) It was done per Code, and (b) The Code required test was performed. If a representative of the AHJ, Owner, or engineer witnesses the tests, they sign the last line of the form to signify that fact only (annotating the form as needed).
- G. After completion of the described system test, specified above, and submission of the above documentation, the contractor is to request the engineer to set up a system acceptance inspection. The system must operate for at least two days prior to this inspection
- H. The fire alarm system will be inspected, with portions of it being functionally tested. This will normally include the use of appropriate means to simulate smoke for testing detectors, as well as functionally testing the system interface with building controls, fire extinguishing systems and the off-premises supervising station. Operation of any smoke removal system will be checked

as instructed by the AHJ. This statistical (sampling) inspection is intended to assure that the contractor has properly installed the system and performed the operational test as required by NFPA 72.

- I. The contractor shall provide two-way radios, ladders, and any other materials needed to test the system, including a suitable smoke source.
- J. SYSTEM DISCONNECTS (Applicable to warranty period repairs and modifications and to modifications to existing building, if applicable):
- K. It is the University's desire to keep all life systems operating at all times. The contractor is to use all available means to avoid the need of disabling fire alarm systems whenever possible.
- L. The contractor shall notify the University of all contact/interface with any alarm detection devices (smoke detectors, pull stations, strobes, horns, panels, etc.). If any disabling, disconnection, re-connection of fire alarm system equipment is necessary, the contractor shall notify the University with 10 working days of notice to make arrangements.
- M. Disabling or disconnection shall be limited to one working day per occasion, and to shorter periods when possible. The Contractor shall be liable for any costs, direct or indirect due to false alarms resulting from Contractors' work. Contractor will be charged for each disconnect/reconnect of fire alarm device.

3.6 DOCUMENTATION AND OWNER TRAINING

- A. In addition to the shop drawing submittal previously described, the contractor shall provide to the engineer two bound copies of the following technical information, for transmittal to the owner: (1) As-built wiring diagram showing all loop numbers and device addresses in the system, plus equipment terminal numbers where they connect to control equipment, (2) Manufacturer's detailed maintenance requirements, (3) Technical literature on all control equipment, isolation modules, power supplies, alarm/supervisory signal initiating devices, alarm notification appliances, relays, etc, (4) The as-built "calculations" sheet referenced in previous paragraphs.

3.7 REVISIONS TO POSTED GRAPHIC PLAN DRAWINGS

- A. The electrical contractor shall revise plan drawings of the fire alarm smoke detection security system as required here. System floor plans shall be framed under glass and posted on wall as directed by Owner.
- B. Provide one plan per floor. Each plan shall be 11" x 17" and shall be framed under glass. Plans shall be black line drawings showing all rooms, stair, columns, doors and correct north arrow. Fire alarm and devices shall be depicted in red color. Provide symbol schedule on each plan. Provide room number in each space where an alarm initiating device is located. Do not show wiring or conduit system but show, in addition to devices and appliances, all system cabinets, modules, relays and stations.
- C. Frame shall be natural aluminum or stainless steel. Affix each drawing to wall using four bolts or screws, as applicable.

- D. All devices shall be identified by their final address number. All lettering should be legible 1/8" high. Final room numbers shall be per actual building numeration not necessarily those depicted on contract documents.

TABLE I - APPLICATIONS MATRIX FOR DETECTION DEVICES

SMOKE/FIRE DETECTOR APPLICATION	ACCEPTABLE DETECTOR TYPES			
	ION	PHOTO	IR/UV FLAME	HEAT
Break Rooms				X
Corridors – Any Occupancy		X		
Office Areas	X	X		
Mech/Elec Equipment Rooms *				
Storage (Conditioned Environment)	X	X		
Duct Smoke Detectors		X		

* Multi-sensor detectors with combined photoelectric and thermal technologies shall be used.

END OF SECTION 28 31 11

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