PROJECT MANUAL FOR: MUHC BAS UPGRADES

PROJECT NUMBER: CP171064

AT
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI

FOR:
THE CURATORS OF THE UNIVERSITY OF MISSOURI

PREPARED BY:
ROSS & BARUZZINI, INC.
6 SOUTH OLD ORCHARD
ST. LOUIS, MO 63119
314-918-8383 (PHONE)
314-918-1766 (FAX)

DATE: January 29, 2020

I hereby certify that Drawing Sheets G000, G100, G102, M000, MD100, MD102, MD200, M100, M100-REF, M101, M102, M102-REF, M103, M104, M105, M106, M107, M108, M109, M200, M201, M600, M700 and M701 and Specification Divisions 07 & 23 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

Signature: ___________________________

I hereby certify that Drawing Sheet E100 and E102 and Specification Division 26 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

Signature: ___________________________

I hereby certify that Drawing Sheet G001 and G002 has been prepared by me, or under my supervision. I further certify that to the best of my knowledge these Drawings and/or Specifications are as required by and in compliance with Building Codes of the University of Missouri.

Signature: ___________________________

ISSUED FOR: Bid Documents
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END OF SECTION
ADVERTISEMENT FOR BIDS

Sealed bids for:

VARIABLE LOCATIONS –
MUHC BAS UPGRADES
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI
PROJECT NUMBER: CP171064 CONSTRUCTION ESTIMATE $198,255 - $220,284

will be received by the Curators of the University of Missouri, Owner, at Campus Facilities, Planning, Design & Construction, Room L100 (Front Reception Desk), General Services Building, University of Missouri, Columbia, Missouri 65211, until 1:30 p.m., C.T., February 19, 2020 and then immediately opened and publicly read aloud.

Drawings, specifications, and other related contract information may be obtained at http://operations-webapps.missouri.edu/pdc/adsite/ad.html. Electronic bid sets are available at no cost and may be printed as desired by the plan holders. No paper copies will be issued. If paper copies are desired, it is the responsibility of the user to print the files or have them printed.

Questions regarding the scope of work should be directed to Roger Czmowski with Ross & Baruzzini at (800) 404-7677 or rczmowski@rossbar.com. Questions regarding commercial conditions should be directed to Brad Rackers at (573) 884-7086 or rackersba@missouri.edu.

A prebid meeting will be held at 1:30 p.m., C.T., February 5, 2020 in the General Services Bldg., CS Conference Room, University of Missouri, Columbia, Missouri, followed by a walk-through at the site. All interested bidders are invited to attend this meeting. A walk-through of the project may be scheduled by contacting the Prebid Inspection Guide at (573) 882-2228 or mucfpmprebidinspectionguides@missouri.edu. A twenty-four to forty-eight hour advance notice is required for all walk-through request.

Information regarding bid results will be available the day following the bid opening by calling (573) 882-1133.

A Diversity Participation goal of 10% Combined MBE, WBE, DBE and Veteran Owned Business and 3% SDVE has been established for this contract.

The Owner reserves the right to waive informalities in bids and to reject any and all bids.

Individuals with special needs as addressed by the Americans with Disabilities Act may contact (573) 882-1133.

Advertisement Date: January 29, 2020

Gary L. Ward
Vice Chancellor for Operations and Chief Operating Officer
University of Missouri
SECTION 1.A

BID FOR LUMP SUM CONTRACT

Date: __________________________

BID OF __________________________
(hereinafter called "Bidder") a corporation* organized and existing under laws of the State of __________________________
a partnership* consisting of __________________________,
an individual* trading as __________________________,
a joint venture* consisting of __________________________.
*Insert Corporation(s), partnership or individual, as applicable.

TO: Curators of the University of Missouri
    C/O Associate Vice Chancellor
    Facilities Room L108
    General Services Building
    University of Missouri – Columbia, Missouri

1. Bidder, in compliance with invitation for bids for construction work in accordance with Drawings and Specifications prepared by Ross & Baruzzini, Inc, entitled "MUHC BAS UPGRADES", project number CP171064 (R&B project number 505-116), dated January 29, 2020 having examined Contract Documents and site of proposed work, and being familiar with all conditions pertaining to construction of proposed project, including availability of materials and labor, hereby proposes to furnish all labor, materials and supplies to construct project in accordance with Contract Documents, within time set forth herein at prices stated below. Prices shall cover all expenses, including taxes not covered by the University of Missouri’s tax exemption status, incurred in performing work required under Contract documents, of which this Bid is a part.

   Bidder acknowledges receipt of following addenda:

   Addendum No. __________________________ Dated _________________
   Addendum No. __________________________ Dated _________________
   Addendum No. __________________________ Dated _________________
   Addendum No. __________________________ Dated _________________

2. In following Bid(s), amount(s) shall be written in both words and figures. In case of discrepancy between words and figures, words shall govern.

3. BID PRICING
   a. Base Bid:
      The Bidder agrees to furnish all labor, materials, tools, and equipment required to replace the existing pneumatic controls with DDC controls on select VAV’s, add final filter pressure monitors, and replace positive pressure monitors; all as indicated on the Drawings and described in these Specifications for sum of:

      ___________________________________ DOLLARS ($ ________________________).

4. PROJECT COMPLETION
   a. Contract Period - Contract period begins on the day the Contractor receives unsinged Contract, Performance Bond, Payment Bond, and "Instructions for Execution of Contract, Bonds, and
Insurance Certificates." Bidder agrees to complete project within One Hundred Twenty (120) calendar days from receipt of aforementioned documents. Fifteen (15) calendar days have been allocated in construction schedule for receiving aforementioned documents from Bidder.

b. Commencement - Contractor agrees to commence work on this project after the "Notice to Proceed" is issued by the Owner. "Notice to Proceed" will be issued within seven (7) calendar days after Owner receives properly prepared and executed Contract documents listed in paragraph 4.a. above.

c. Refer to Special Scheduling Requirements in Special Conditions for specific scheduling of the following activities:
   1. Special work times
   2. HVAC Testing and Balancing
   3. Utility Shut-downs, Outages and Tie-ins

5. SUPPLIER DIVERSITY PARTICIPATION GOALS

a. The Contractor shall have as a combined goal subcontracting with Minority Business Enterprise (MBE), Women Business Enterprise (WBE), Disadvantage Business Enterprise (DBE), and/or Veteran Owned Business of TEN PERCENT (10%); and with Service Disabled Veteran Owned Business (SDVE) of THREE PERCENT (3%) of awarded contract price for work to be performed.

b. Requests for waiver of this goal shall be submitted on the attached Application For Waiver form. A determination by the Director of Facilities Planning & Development, UM, that a good faith effort has not been made by Contractor to achieve above stated goal may result in rejection of bid.

c. The Undersigned proposes to perform work with following Supplier Diversity participation level:

   MBE, WBE, DBE, and/or VETERAN PERCENTAGE PARTICIPATION:
   __________________________________________ percent (_________ %)

   SDVE PERCENTAGE PARTICIPATION: _______________________________________ percent (________ %)

d. A Supplier Diversity Compliance Evaluation form shall be submitted with this bid for each diverse subcontractor to be used on this project.

6. BIDDER'S ACKNOWLEDGMENTS

a. Bidder declares that he has had an opportunity to examine the site of the work and he has examined Contract Documents therefore; that he has carefully prepared his bid upon the basis thereof; that he has carefully examined and checked bid, materials, equipment and labor required thereunder, cost thereof, and his figures therefore. Bidder hereby states that amount, or amounts, set forth in bid is, or are, correct and that no mistake or error has occurred in bid or in Bidder's computations upon which this bid is based. Bidder agrees that he will make no claim for reformation, modifications, revisions or correction of bid after scheduled closing time for receipt of bids.

b. Bidder agrees that bid shall not be withdrawn for a period of Sixty (60) days after scheduled closing time for receipt of bids.

c. Bidder understands that Owner reserves right to reject any or all bids and to waive any informalities in bidding.

d. Accompanying the bid is a bid bond, or a certified check, or an irrevocable letter of credit, or
a cashier's check payable without condition to "The Curators of the University of Missouri" which is an amount at least equal to five percent (5%) of amount of largest possible total bid herein submitted, including consideration of Alternates.

e. Accompanying the bid is a Bidder's Statement of Qualifications. Failure of Bidder to submit the Bidder's Statement of Qualifications with the bid may cause the bid to be rejected. Owner does not maintain Bidder's Statements of Qualifications on file.

f. It is understood and agreed that bid security of two (2) lowest and responsive Bidders will be retained until Contract has been executed and an acceptable Performance Bond and Payment Bond has been furnished. It is understood and agreed that if the bid is accepted and the undersigned fails to execute the Contract and furnish acceptable Performance/Payment Bond as required by Contract Documents, accompanying bid security will be realized upon or retained by Owner. Otherwise, the bid security will be returned to the undersigned.

7. BIDDER'S CERTIFICATE

Bidder hereby certifies:

a. His bid is genuine and is not made in interest of or on behalf of any undisclosed person, firm or corporation, and is not submitted in conformity with any agreement or rules of any group, association or corporation.

b. He has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

c. He has not solicited or induced any person, firm or corporation to refrain from bidding.

d. He has not sought by collusion or otherwise to obtain for himself any advantage over any other Bidder or over Owner.

e. He will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin in connection with performance of work.

f. By virtue of policy of the Board of Curators, and by virtue of statutory authority, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, mined or grown within the State of Missouri. By virtue of policy of the Board of Curators, preference will also be given to all Missouri firms, corporations, or individuals, all as more fully set forth in "Information For Bidders."

8. BIDDER'S SIGNATURE

Note: All signatures shall be original; not copies, photocopies, stamped, etc.

<table>
<thead>
<tr>
<th>Authorized Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed Name</td>
<td>Title</td>
</tr>
<tr>
<td>Company Name</td>
<td></td>
</tr>
<tr>
<td>Mailing Address</td>
<td></td>
</tr>
<tr>
<td>City, State, Zip</td>
<td></td>
</tr>
<tr>
<td>Phone No.</td>
<td>Federal Employer ID No.</td>
</tr>
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<table>
<thead>
<tr>
<th>Fax No.</th>
<th>E-Mail Address</th>
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<tr>
<th>Circle one:</th>
<th>Individual</th>
<th>Partnership</th>
<th>Corporation</th>
<th>Joint Venture</th>
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</tbody>
</table>

If a corporation, incorporated under the laws of the State of__________

Licensed to do business in the State of Missouri?  ____yes    _____no

(Each Bidder shall complete bid form by manually signing on the proper signature line above and supplying required information called for in connection with the signature. Information is necessary for proper preparation of the Contract, Performance Bond and Payment Bond. Each Bidder shall supply information called for in accompanying "Bidder's Statement of Qualifications.")

END OF SECTION
UNIVERSITY OF MISSOURI
BIDDER'S STATEMENT OF QUALIFICATIONS

Submit with Bid for Lump Sum Contract in separate envelope appropriately labeled. Attach additional sheet if necessary.

1. Company Name

   Phone# ___________________________ Fax #: ___________________________

   Address ___________________________

2. Number of years in business ______. If not under present firm name, list previous firm names and types of organization.

3. List contracts on hand (complete the following schedule, include telephone number).

<table>
<thead>
<tr>
<th>Project &amp; Address</th>
<th>Owner/Owner's Representative</th>
<th>Phone Number</th>
<th>Architect</th>
<th>Amount of your Contract</th>
<th>Percent Completed</th>
</tr>
</thead>
</table>

4. General character of work performed by your company personnel.

5. List important projects completed in the last five (5) years on a type similar to the work now bid for, including approximate cost and telephone number.

<table>
<thead>
<tr>
<th>Project &amp; Address</th>
<th>Owner/Owner's Representative</th>
<th>Phone Number</th>
<th>Architect</th>
<th>Amount of your Contract</th>
<th>Percent Completed</th>
</tr>
</thead>
</table>

6. Other experience qualifying you for the work now bid.

7. No default has been made in any contract complete or incomplete except as noted below:
   (a) Number of contracts on which default was made ________________
   (b) Description of defaulted contracts and reason therefor

8. (a) Have you or your company participated in any contract subject to an equal opportunity clause similar to that described in the General Conditions?
     Yes _______ No _______

   (b) Have you filed all required compliance reports?
     Yes _______ No _______
(c) Is fifty percent or more of your company owned by a minority?
   Yes _______  No _____

(d) Is fifty percent or more of your company owned by a woman?
   Yes _______  No _____

(e) Is fifty percent or more of your company owned by a service disabled veteran?
   Yes _______  No _____

(f) Is fifty percent or more of your company owned by a veteran?
   Yes _______  No _____

(g) Is your company a Disadvantaged Business Enterprise?
   Yes _______  No _____

9. Have you or your company been suspended or debarred from working at any University of Missouri campus?
   Yes _______  No _____ (If the answer is "yes", give details.)

10. Have any administrative or legal proceedings been started against you or your company alleging violation of any wage and hour regulations or laws?
    Yes _______  No _____ (If the answer is "yes", give details.)

11. Workers Compensation Experience Modification Rates (last 3 yrs): ______/_____/_____
    Incidence Rates (last 3 years): ______/_____/_____

12. List banking references.

13. (a) Do you have a current confidential financial statement on file with Owner?
    Yes _______  No _____ (If not, and if desired, Bidder may submit such statement with bid, in a separate sealed and labeled envelope.)

    (b) If not, upon request will you file a detailed confidential financial statement within three (3) days?
    Yes _______  No _____

Dated at __________________________ this __________ day of _________________________ 20____

Name of Organization

__________________________________________
Signature

__________________________________________
Printed Name

__________________________________________
Title of Person Signing

END OF SECTION
UNIVERSITY OF MISSOURI
BIDDER'S STATEMENT OF QUALIFICATIONS FOR ASBESTOS ABATEMENT

Submit with Bid for Lump Sum Contract in separate envelope appropriately labeled. Attach additional sheet if necessary.

1. Company Name _____________________________  Phone# __________________
   Address ______________________________________________________________

2. State of Missouri Registration number ____________________________

3. Number of years in business ____. If not under present firm name, list previous firm names and types of organization.

4. List contracts on hand (complete the following schedule, include telephone number).

   Project & Address   Owner/Owner's Representative   Phone Number   Architect   Amount of your Contract   Percent Completed

5. General character of work performed by your company personnel.

6. List important projects completed in the last five (5) years on a type similar to the work now bid for, including approximate cost and telephone number.

   Project & Address   Owner/Owner's Representative   Phone Number   Architect   Amount of your Contract   Percent Completed

7. Other experience qualifying you for the work now bid.

8. No default has been made in any contract complete or incomplete except as noted below:
   (a) Number of contracts on which default was made ______________________
   (b) Description of defaulted contracts and reason therefor ____________________

9. (a) Have you or your company participated in any contract subject to an equal opportunity clause similar to that described in the General Conditions?
    Yes _____  No _____

   (b) Have you filed all required compliance reports?
    Yes _____  No _____
(c) Is fifty percent or more of your company owned by a minority?
   Yes   No

(d) Is fifty percent or more of your company owned by a woman?
   Yes   No

(e) Is fifty percent or more of your company owned by a service disabled veteran?
   Yes   No

(f) Is fifty percent or more of your company owned by a veteran?
   Yes   No

(g) Is your company a Disadvantaged Business Enterprise?
   Yes   No

10. Have you or your company been suspended or debarred from working at any University of Missouri campus?
    Yes   No (If the answer is "yes", give details.)

11. Have any administrative or legal proceedings been started against you or your company alleging violation of any wage and hour regulations or laws?
    Yes   No (If the answer is "yes", give details.)

12. Workers Compensation Experience Modification Rates (last 3 yrs): / / 
    Incidence Rates (last 3 years): / / 

13. List banking references.

14. (a) Do you have a current confidential financial statement on file with Owner?
    Yes   No (If not, and if desired, Bidder may submit such statement with bid, in a separate sealed and labeled envelope.)

    (b) If not, upon request will you file a detailed confidential financial statement within three (3) days?
    Yes   No

Dated at ___________________________ this __________ day of ___________________ 20___

______________________________
Name of Organization

______________________________
Signature

______________________________
Printed Name

______________________________
Title of Person Signing

END OF SECTION
SUPPLIER DIVERSITY COMPLIANCE EVALUATION FORM

This form shall be completed by Bidders and submitted with the Bidder's Statement of Qualifications form for each diverse firm who will function as a subcontractor on the contract.

The undersigned submits the following data with respect to this firm's assurance to meet the goal for Supplier Diversity participation.

I. Project:

II. Name of General Contractor:

III. Name of Diverse Firm:
Address:
Phone No.:                Fax No.:
Status (check one)             MBE  WBE  Veteran  Service Disabled Veteran  DBE

IV. Describe the subcontract work to be performed. (List Base Bid work and any Alternate work separately):
Base Bid:

V. Dollar amount of contract to be subcontracted to the Diverse firm:
Base Bid:
Alternate(s), (Identify separately):

VI. Is the proposed subcontractor listed in the Directory of M/W/DBE Vendors, Directory of Serviced Disabled Veterans and/or the Directory of Veterans maintained by the State of Missouri?
Yes          No

SD/1
Is the proposed subcontractor certified as a diverse supplier by any of the following: federal government agencies, state agencies, State of Missouri city or county government agencies, Minority and/or WBE certifying agencies?

Yes _____ No _____ If yes, please provide details and attach a copy of the certification.

Does the proposed subcontractor have a signed document from their attorney certifying the Supplier as a Diverse and meeting the 51% owned and committed requirement?

Yes _____ No _____ If yes, please attach letter.

Signature: ________________________________

Name: ________________________________

Title: ________________________________

Date: ________________________________
APPLICATION FOR WAIVER

This form shall be completed and submitted with the Bidder's Statement of Qualifications. Firms wishing to be considered for award are required to demonstrate that a good faith effort has been made to include diverse suppliers. This form will be used to evaluate the extent to which a good faith effort has been made. The undersigned submits the following data with respect to the firm's efforts to meet the goal for Supplier Diversity Participation.

1. List pre-bid conferences your firm attended where Supplier Diversity requirements were discussed.

2. Identify advertising efforts undertaken by your firm which were intended to recruit potential diverse subcontractors for various aspects of this project. Provide names of newspapers, dates of advertisements and copies of ads that were run.

3. Note specific efforts to contact in writing those diverse suppliers capable of and likely to participate as subcontractors for this project.

4. Describe steps taken by your firm to divide work into areas in which diverse suppliers/contractors would be capable of performing.

5. What efforts were taken to negotiate with prospective diverse suppliers/contractors for specific sub-bids? Include the names, addresses, and telephone numbers of diverse suppliers/contractors contacted, a description of the information given to diverse suppliers/contractors regarding plans and specifications for the assigned work, and a statement as to why additional agreements were not made with diverse suppliers/contractors.

6. List reasons for rejecting a diverse supplier/contractor which has been contacted.
8. Describe the follow-up contacts with diverse suppliers/contractors made by your firm after the initial solicitation.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

9. Describe the efforts made by your firm to provide interested diverse suppliers/contractors with sufficiently detailed information about the plans, specifications and requirements of the contract.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

10. Describe your firm's efforts to locate diverse suppliers/contractors.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Based on the above stated good faith efforts made to include supplier diversity, the bidder hereby requests that the original supplier diversity percentage goal be waived and that the percentage goal for this project be set at ________ percent.

The undersigned hereby certifies, having read the answers contained in the foregoing Application for Waiver, that they are true and correct to the best of his/her knowledge, information and belief.

Signature

________________________________________________________________________

Name

________________________________________________________________________

Title

________________________________________________________________________

Company

________________________________________________________________________

Date
AFFIDAVIT

“The undersigned swears that the foregoing statements are true and correct and include all material information necessary to identify and explain the operation of ______________________ (name of firm) as well as the ownership thereof. Further, the undersigned agrees to provide through the prime contractor or directly to the Contracting Officer current, complete and accurate information regarding actual work performed on the project, the payment therefore and any proposed changes, if any, of the project, the foregoing arrangements and to permit the audit and examination of books, records and files of the named firm. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under federal or state laws concerning false statements.”

Note - If, after filing this information and before the work of this firm is completed on the contract covered by this regulation, there is any significant change in the information submitted, you must inform the Director of Facilities Planning and Development of the change either through the prime contractor or directly.

Signature ________________________________________________

Name ______________________________________________________

Title ______________________________________________________

Date _______________________________________________________  

Corporate Seal (where appropriate)

Date _______________________________________________________

State of __________________________________________________

County of _________________________________________________

On this ______________________ day of __________________________, 19__, before me appeared (name) ____________________________________ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (name of firm) ____________________________ to execute the affidavit and did so as his or her own free act and deed.

(Seal)

Notary Public ________________________________________________

Commission expires __________________________________________
AFFIDAVIT FOR AFFIRMATIVE ACTION

State of Missouri )
 ) ss.
County of )

_______________________________________________________________________ first being duly sworn on his/her oath
states: that he/she is the (sole proprietor, partner, or officer) of __________________________________________________
_______________________ a (sole proprietorship, partnership, corporation), and as such (sole proprietor, partner, or officer) is
duly authorized to make this affidavit on behalf of said (sole proprietorship, partnership, corporation); that under the contract
known as "___________________________________________________________________________________________"
Project No. ________________ less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative
Action requirements as set forth in the "Nondiscrimination in Employment Equal Opportunity," Supplemental Special
Conditions, and Article 13 in the General Conditions do not apply.

________________________________________

Subscribed and sworn before me this _______________ day of ___________________________, 19________.

My commission expires __________________________________________________________, 19________.
CERTIFYING SUPPLIER DIVERSITY AGENCIES

Diverse firms are defined in General Conditions Articles 1.1.7 and those businesses must be certified as disadvantaged by an approved agency. The Bidder is responsible for obtaining information regarding the certification status of a firm. A list of certified firms may be obtained by contacting the agencies listed below. Any firm listed as disadvantaged by any of the following agencies will be classified as a diverse firm by the Owner.

St. Louis Development Corporation  
1520 Market St., Ste. 2000  
St. Louis, MO 63103  
P: 314.982.1400  
W: www.stlouis-mo.gov/sldc/

Bi-State Development  
211 N. Broadway, Ste. 700  
St. Louis, MO 63102  
P: 314.982.1400  
W: www.metrostlouis.dbesystem.com

St. Louis Minority Business Council  
211 N. Broadway, Ste. 1300  
St. Louis, MO 63102  
P: 314.231.5555  
W: www.slmbc.org

U.S. Small Business Administration - St. Louis, MO  
8(a) Contractors, Minority Small Business  
1222 Spruce Street, Suite 10.103  
St. Louis, MO 63101  
P: 314.539.6600  
W: www.sba.gov

Lambert St. Louis International Airport  
Business Diversity Development Office  
11495 Navaid  
Bridgeton, MO 63044  
P: 314-426-8111  

City of Kansas City, Missouri  
Human Relations Department, MBE/WBE Division  
4th Floor, City Hall  
414 E. 12th Street  
Kansas City, MO 64106  
P: 816.513.1836  
W: kcmohrd.mwdbce.com/?TN=kcmohrd

Mid-States Minority Supplier Development Council  
505 N. 7th Street, Ste. 1820  
St. Louis, MO 63101  
P: 314.278.5616  
W: midstatesdc.org

U.S. Small Business Administration - Kansas City, MO  
8(a) Contractors, Minority Small Business  
1000 Walnut, Suite 500  
Kansas City, MO 64106  
P: 816.426.4900  
W: kcmohrd.mwdbce.com/?TN=kcmohrd

Missouri Department of Transportation  
Division of Construction  
1617 Missouri Blvd.  
P.O. Box 270  
Jefferson City, MO 65102  
P: 573.526.2978  
W: www.modot.org/mrcc-directory

Illinois Department of Transportation  
MBE/WBE Certification Section  
2300 Dirksen Parkway  
Springfield, IL 62764  
217/782-5490; 217/785-1524 (Fax)  
W: webapps.dot.illinois.gov/UCP/ExternalSearch

State of Missouri OA  
Office of Equal Opportunity  
301 W. High St. HSC Rm 870-B  
Jefferson City, MO 65101  
P: 877.259.2963  
W: oeo.mo.gov/
Minority Newspapers

Dos Mundos Bilingual Newspaper
902A Southwest Blvd.
Kansas City, MO 64108
816-221-4747
www.dosmundos.com

Kansas City Hispanic News
2918 Southwest Blvd.
Kansas City, MO 64108
816/472-5246
www.kchispanicnews.com

The Kansas City Globe
615 E. 29th Street
Kansas City, MO 64109
816-531-5253
www.thekcglobe.com/about_us.php

St. Louis American
4144 Lindell
St. Louis, MO 63108
314-533-8000
www.stlameric.com

St. Louis Chinese American News
1766 Burns Ave, Suite 201
St. Louis, MO 63132
314-432-3858
www.scannews.com

St. Louis Business Journal
815 Olive St., Suite 100
St. Louis, MO 63101
314-421-6200
www.bizjournal.com/stlouis

Kansas City Business Journal
1100 Main Street, Suite 210
Kansas City, MO 64105
816-421-5900
www.bizjournals.com/kansascity
AFFIDAVIT OF SUPPLIER DIVERSITY PARTICIPATION

The apparent low Bidder shall complete and submit this form within 48 hours of bid opening for each Diverse firm that will participate on the contract.

1. Diverse Firm: __________________________________________
   Contact Name: __________________________________________
   Address: __________________________________________
   Phone No.: __________________________ E-Mail:______________

   Status (check one) MBE  WBE  Veteran  Service Disabled Veteran  DBE
   If MBE, Certified as (circle one): 1) Black American  2) Hispanic American  3) Native American  4) Asian American

2. Is the proposed diverse firm certified by an approved agency [see IFB article 15]?  Yes ☐ No ☐
   Agency: __________________________ [attach copy of certification authorization from agency]
   Certification Number: __________________________

3. Diverse firm scope work and bid/contract dollar amount of participation (List Base Bid and Alternate work separately). The final Dollar amount will be determined at substantial completion:

<table>
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<tr>
<th>Scope of Work</th>
<th>Bid/Contract Amount</th>
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<tr>
<td>Base Bid</td>
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<tr>
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<td>Alternate #6</td>
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</table>

The undersigned certifies that the information contained herein (i.e. Scope of Work and Bid/Contract Amount) is true and correct to the best of their knowledge, information and belief.

General Contractor: __________________________ Diverse Firm: __________________________
Signature: __________________________ Signature: __________________________
Name: __________________________ Name: __________________________
Title: __________________________ Title: __________________________
Date: __________________________ Date: __________________________

The undersigned certifies that the information contained herein (i.e. Scope of Work and Final Dollar Amount) is true and correct to the best of their knowledge, information and belief. If the Final Dollar Amount is different than the Bid/Contract Amount, then attach justification for the difference.

Contractor: __________________________ Diverse Firm: __________________________
Signature: __________________________ Signature: __________________________
Name: __________________________ Name: __________________________
Title: __________________________ Title: __________________________
Date: __________________________ Date: __________________________
# University of Missouri

## INFORMATION FOR BIDDERS

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### 1. Contract Documents

1.1 Drawings, specifications, and other contract documents, pursuant to work which is to be done, may be obtained shown in the Advertisement for Bids and Special Conditions.

### 2. Bidder Obligations

2.1 Before submitting bids each bidder shall carefully examine the drawings and specifications and related contract documents, visit site of work and fully inform themselves as to all existing conditions, facilities, restrictions and other matters which can affect the work or the cost thereof.

2.2 Each bidder shall include in their bid the cost of all work and materials required to complete the contract in a first-class manner as hereinafter specified.

2.3 Failure or omission of any bidder to receive or examine any form, instrument, addendum, or other document, or to visit the site and acquaint themselves with existing conditions, shall in no way relieve them from any obligation with respect to their bid or contract, and no extra compensation will be allowed by reason of any thing or matter concerning which bidder should have fully informed themselves prior to bidding.

2.4 Submission of bids shall be deemed acceptance of the above obligations and each and every obligation required to be performed by all of the contract documents in the event the bid is accepted.

### 3. Interpretation of Documents

3.1 If any prospective bidder is in doubt as to the true meaning of any part of the drawings and specifications or contract documents, they shall submit a written request to the Architect for an interpretation.

3.2 Requests for such interpretations shall be delivered to the Architect at least one (1) week prior to time for receipt of bids.

### 3.3 Bids shall be based only on interpretations issued in the form of addenda mailed to each person who is on the Architect's record as having received a set of the contract documents.

### 4. Bids

4.1 Bids shall be received separately or in combination as shown in and required by the Bid for Lump Sum contract. Bids will be completed so as to include insertion of amounts for alternate bids, unit prices and cost accounting data.

4.2 Bidders shall apportion each base bid between various phases of the work, as stipulated in the Bid for Lump Sum contract. All work shall be done as defined in the specifications and as indicated on the drawings.

4.3 Bids shall be presented in sealed envelopes which shall be plainly marked "Bids for (indicate name of project from cover sheet)", and mailed or delivered to the building and room number specified in the Advertisement for Bids. Bidders shall be responsible for actual delivery of bids during business hours, and it shall not be sufficient to show that a bid was mailed in time to be received before scheduled closing time for receipt of bids, nor shall it be sufficient to show that a bid was somewhere in a university facility.

4.4 The bidder's price shall include all federal sales, excise, and similar taxes, which may be lawfully assessed in connection with their performance of work and purchase of materials to be incorporated in the work. City & State taxes shall not be included as defined within Article 3.16 of the General Conditions for Construction Contract included in the contract documents.

4.5 Bids shall be submitted on a single bid form, furnished by the Owner or Architect. Do not remove the bid form from the specifications.

4.6 No bidder shall stipulate in their bid any conditions not contained in the bid form.
4.7 The Owner reserves the right to waive informalities in bids and to reject any or all bids.

5. Modification and Withdrawal of Bids
5.1 The bidder may withdraw their bid at any time before the scheduled closing time for receipt of bids, but no bidder may withdraw their bid after the scheduled closing time for receipt of bids.

5.2 Only telegrams, letters and other written requests for modifications or correction of previously submitted bids, contained in a sealed envelope which is plainly marked "Modification of Bid on (name of project on cover sheet)," which are addressed in the same manner as bids, and are received by Owner before the scheduled closing time for receipt of bids will be accepted and bids corrected in accordance with such written requests.

6. Signing of Bids
6.1 Bids which are signed for a partnership shall be manually signed in the firm name by at least one partner, or in the firm name by Attorney-in-Fact. If signed by Attorney-in-Fact there should be attached to the bid, a Power of Attorney evidencing authority to sign the bid dated the same date as the bid and executed by all partners of the firm.

6.2 Bids that are signed for a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written below corporate name. Title of office held by the person signing for the corporation shall appear below the signature of the officer.

6.3 Bids that are signed by an individual doing business under a firm name, shall be manually signed in the name of the individual doing business under the proper firm name and style.

6.4 Bids that are signed under joint venture shall be manually signed by officers of the firms having authority to sign for their firm.

7. Bid Security
7.1 Each bid shall be accompanied by a bid bond, certified check, or cashier's check, acceptable to and payable without condition to The Curators of the University of Missouri, in an amount at least equal to five percent (5%) of bidder's bid including additive alternates.

7.2 Bid security is required as a guarantee that bidder will enter into a written contract and furnish a performance bond within the time and in form as specified in these specifications; and if successful bidder fails to do so, the bid security will be realized upon or retained by the Owner. The apparent low bidder shall notify the Owner in writing within 48 hours (2 work days) of the bid opening of any circumstance that may affect the bid security including, but not limited to, a bidding error. This notification will not guarantee release of the bidder’s security and/or the bidder from the Bidder’s Obligations.

7.3 If a bid bond is given as a bid security, the amount of the bond may be stated as an amount equal to at least five percent (5%) of the bid, including additive alternates, described in the bid. The bid bond shall be executed by the bidder and a responsible surety licensed in the State of Missouri with a Best’s rating of no less than A-/.XI.

7.4 It is specifically understood that the bid security is a guarantee and shall not be considered as liquidated damages for failure of bidder to execute and deliver their contract and performance bond, nor limit or fix bidder's liability to Owner for any damages sustained because of failure to execute and deliver the required contract and performance bond.

7.5 Bid security of the two (2) lowest and responsive Bidders will be retained by the Owner until a contract has been executed and an acceptable bond has been furnished, as required hereby, when such bid security will be returned. Surety bonds of all other bidders will be destroyed and all other alternative forms of bid bonds will be returned to them within ten (10) days after Owner has determined the two (2) lowest and responsive bids.

8. Bidder's Statement of Qualifications
8.1 Each bidder submitting a bid shall present evidence of their experience, qualifications, financial responsibility and ability to carry out the terms of the contract by completing and submitting with their bid the schedule of information set forth in the form furnished in the bid form.

8.2 Such information, a single copy required in a separate sealed envelope, will be treated as confidential information by the Owner, within the meaning of Missouri Statue 610.010.

8.3 Bids not accompanied with current Bidder's Statement of Qualifications may be rejected.

9. Award of Contract
9.1 The Owner reserves the right to let other contracts in connection with the work, including, but not by way of limitation, contracts for furnishing and installation of furniture, equipment, machines, appliances, and other apparatus.

9.2 In awarding the contract, the Owner may take into consideration the bidder's, and their subcontractor's, ability to handle promptly the additional work, skill, facilities, capacity, experience, ability, responsibility, previous work, financial standing of bidder, and the bidder's ability to provide the required bonds and insurance; quality, efficiency and construction of equipment proposed to be furnished; period of time within which equipment is proposed to be furnished and delivered; success in achieving the specified Supplier Diversity goal, or demonstrating a good faith effort as described in Article 15; necessity of prompt and efficient completion of work herein described, and the bidder’s status as suspended or debarred. Inability of any bidder to meet the requirements mentioned above may be cause for rejection of their bid.

10. Contract Execution
10.1 The Contractor shall submit within fifteen (15) days from receipt of notice, the documents required in Article 9 of the General Conditions for Construction Contract included in the contract documents.
10.2 No bids will be considered binding upon the Owner until the documents listed above have been furnished. Failure of Contractor to execute and submit these documents within the time period specified will be treated, at the option of the Owner, as a breach of the bidder's bid security under Article 7 and the Owner shall be under no further obligation to Bidder.

11. Contract Security
11.1 When the Contract sum exceeds $50,000, the Contractor shall procure and furnish a Performance bond and a Payment bond in the form prepared by Owner. Each bond shall be in the amount equal to one hundred percent (100%) of the contract sum, as well as adjustments to the Contract Sum. The Performance Bond shall secure and guarantee Contractor’s faithful performance of this Contract, including but not limited to Contractor’s obligation to correct defects after final payment has been made as required by the Contract Documents. The Payment Bond shall secure and guarantee payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. These Bonds shall be in effect through the duration of the Contract plus the Guaranty Period as required by the Contract Documents.

11.2 The bonds required hereunder shall be meet all requirements of Article 11 of the General Conditions for Construction Contract included in the contract documents.

11.3 If the surety of any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to conduct business in the State of Missouri is terminated, or it ceases to meet the requirements of this Article 11, Contractor shall within ten (10) days substitute another bond and surety, both of which must be acceptable to Owner. If Contractor fails to make such substitution, Owner may procure such required bonds on behalf of Contractor at Contractor’s expense.

12. Time of Completion
12.1 Contractors shall agree to commence work within five (5) days of the date "Notice to Proceed" is received from the Owner, and the entire work shall be completed by the completion date specified or within the number of consecutive calendar days stated in the Special Conditions. The duration of the construction period, when specified in consecutive calendar days, shall begin when the contractor receives notice requesting the documents required in Article 9 of the General Conditions for Construction Contract included in the contract documents.

13. Number of Contract Documents
13.1 The Owner will furnish the Contractor a copy of the executed contract and performance bond.

13.2 The Owner will furnish the Contractor the number of copies of complete sets of drawings and specifications for the work, as well as, clarification and change order drawings pertaining to change orders required during construction as set forth in the Special Conditions.

14. Missouri Products and Missouri Firms
14.1 The Curators of the University of Missouri have adopted a policy which is binding upon all employees and departments of the University of Missouri, and which by contract, shall be binding upon independent contractors and subcontractors with the University of Missouri whereby all other things being equal, and when the same can be secured without additional cost over foreign products, or products of other states, a preference shall be granted in all construction, repair and purchase contracts, to all products, commodities, materials, supplies and articles mined, grown, produced and manufactured in marketable quantity and quality in the State of Missouri, and to all firms, corporations or individuals doing business as Missouri firms, corporations or individuals. Each bidder submitting a bid agrees to comply with, and be bound by the foregoing policy.

15. SUPPLIER DIVERSITY
15.1 Award of Contract
The Supplier Diversity participation goal for this project is stated on the Bid for Lump Sum Contract Form, and the Owner will take into consideration the bidder's success in achieving the Supplier Diversity participation goal in awarding the contract. Inability of any bidder to meet this requirement may be cause for rejection of their bid.

The University will grant a three (3) point bonus preference to a Missouri based, certified Service Disabled Veteran Enterprise (SDVE) bidder as defined in Article 1 – (Supplier Diversity Definitions) of the General Conditions of the Contract for Construction included in the contract documents. The three percent (3%) goal can be met, and the bonus points obtained, by a qualified SDVE vendor and/or through the use of qualified subcontractors or suppliers that provide at least three percent (3%) of the total contract value.

15.2 List of Supplier Diversity Firms
15.2.1 The bidder shall submit as part of their bid a list of diverse firms performing as contractor, subcontractors, and/or suppliers. The list shall specify the single designated diverse firm name and address. If acceptance or non-acceptance of alternates will affect the designation of a subcontractor, provide information for each affected category.

15.2.2 Failure to include a complete list of diverse firms may be grounds for rejection of the bid.

15.2.3 The list of diverse firms shall be submitted in addition to any other listing of subcontractors required in the Bid for Lump Sum Contract Form.

15.3 Supplier Diversity Percentage Goal
The bidder shall have a minimum goal of subcontracting with diverse contractors, subcontractors, and suppliers, the percent of contract price stated in the Supplier Diversity goal paragraph of the Bid for Lump Sum Contract Form.

15.4 Supplier Diversity Percent Goal Computation
15.4.1 The total dollar value of the work granted to the diverse firms by the successful bidder is counted towards the applicable goal of the entire contract, unless otherwise noted below.

15.4.2 The bidder may count toward the Supplier Diversity goal only expenditures to diverse firms that perform a commercially useful function in the work of a contract. A diverse firm is considered to perform a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by
actually performing, managing and supervising the work involved. A bidder that is a certified diverse firm may count as 100% of the contract towards the Supplier Diversity goal. For projects with separate MBE, SDVE, and WBE/Veteran /DBE goals, a MBE firm bidding as the prime bidder is expected to obtain the required SDVE, and WBE/Veteran/DBE participation; a WBE or Veteran or DBE firm bidding as the prime bidder is expected to obtain the required MBE and SDVE participation and a SDVE firm bidding as the prime bidder is expected to obtain the required MBE, and WBE/Veteran/DBE participation.

15.4.3 When a MBE, WBE, Veteran Business Enterprise, DBE, or SDVE performs work as a participant in a joint venture, only the portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the MBE, WBE, Veteran Business Enterprise, DBE, or SDVE performs with its own forces shall count toward the MBE, WBE, Veteran Business Enterprise, DBE, or SDVE individual contract percentages.

15.4.4 The bidder may count toward its Supplier Diversity goal expenditures for materials and supplies obtained from diverse suppliers and manufacturers, provided the diverse firm assumes the actual and contractual responsibility for the provision of the materials and supplies.

15.4.4.1 The bidder may count its entire expenditure to a diverse manufacturer. A manufacturer shall be defined as an individual or firm that produces goods from raw materials or substantially alters them before resale.

15.4.4.2 The bidder may count its entire expenditure to diverse suppliers that are not manufacturers provided the diverse supplier performs a commercially useful function as defined above in the supply process.

15.4.4.3 The bidder may count 25% of its entire expenditures to diverse firms that do not meet the definition of a subcontractor, a manufacturer, nor a supplier. Such diverse firms may arrange for, expedite, or procure portions of the work but are not actively engaged in the business of performing, manufacturing, or supplying that work.

15.4.5 The bidder may count toward the Supplier Diversity goal that portion of the total dollar value of the work awarded to a certified joint venture equal to the percentage of the ownership and control of the diverse partner in the joint venture.

15.4.6 On projects with separate MBE and WBE/Veteran/DBE goals, the Owner may allow MBE participation provided in excess of the MBE goal to be counted towards the WBE/Veteran/DBE goal.

15.5 Certification by Bidder of Diverse Firms

15.5.1 The bidder shall submit with its bid the information requested in the "Supplier Diversity Compliance Evaluation Form" for every diverse firm the bidder intends to award work to on the contract.

15.5.2 Diverse firms are defined in Article 1 – (Supplier Diversity Definitions) of the General Conditions of the Contract for Construction included in the contract documents, and as those businesses certified as disadvantaged by an approved agency. The bidder is responsible for obtaining information regarding the certification status of a firm. A list of certified firms may be obtained by contacting the agencies listed in the proposal form document “Supplier Diversity Certifying Agencies”. Any firm listed as disadvantaged by any of the identified agencies will be classified as a diverse firm by the Owner.

15.5.3 Bidders are urged to encourage their prospective diverse contractors, subcontractors, joint venture participants, team partners, and suppliers who are not currently certified to obtain certification from one of the approved agencies.

15.6 Supplier Diversity Participation Waiver

15.6.1 The bidder is required to make a good faith effort to locate and contract with diverse firms. If a bidder has made a good faith effort to secure the required diverse firms and has failed, the bidder shall submit with the bid, the information requested in "Application for Supplier Diversity Participation Waiver." The Contracting Officer will review the bidder’s actions as set forth in the bidder's "Application for Waiver" and any other factors deemed relevant by the Contracting Officer to determine if a good faith effort has been made to meet the applicable percentage goal. If the bidder is judged not to have made a good faith effort, the bid may be rejected. Bidder’s who demonstrate that they have made a good faith effort to include Supplier Diversity participation may be awarded the contract regardless of the percent of Supplier Diversity participation, provided the bid is otherwise acceptable and is determined to be the best bid.

15.6.2 To determine good faith effort of the bidder, the Contracting Officer may evaluate factors including, but not limited to, the following:

15.6.2.1 The bidder’s attendance at pre-proposal meetings scheduled to inform bidders and diverse firms of contracting and subcontracting opportunities and responsibilities associated with Supplier Diversity participation.

15.6.2.2 The bidder’s advertisements in general circulation trade association, and diverse (minority) focused media concerning subcontracting opportunities.

15.6.2.3 The bidder’s written notice to specific diverse firms that their services were being solicited in sufficient time to allow for their effective participation.

15.6.2.4 The bidder’s follow-up attempts to the initial solicitation(s) to determine with certainty whether diverse firms were interested.

15.6.2.5 The bidder’s efforts to divide the work into packages suitable for subcontracting to diverse firms.

15.6.2.6 The bidder’s efforts to provide interested diverse firms with sufficiently detailed information about the drawings, specific actions and requirements of the contract, and clear scopes of work for the firms to bid on.
15.6.2.7 The bidder’s efforts to solicit for specific sub-bids from diverse firms in good faith. Documentation should include names, addresses, and telephone numbers of firms contacted a description of all information provided the diverse firms, and an explanation as to why agreements were not reached.

15.6.2.8 The bidder's efforts to locate diverse firms not on the directory list and assist diverse firms in becoming certified as such.

15.6.2.9 The bidder's initiatives to encourage and develop participation by diverse firms.

15.6.2.10 The bidder’s efforts to help diverse firms overcome legal or other barriers impeding the participation of diverse firms in the construction contract.

15.6.2.11 The availability of diverse firms and the adequacy of the bidder's efforts to increase the participation of such business provided by the persons and organizations consulted by the bidder.

15.7 Submittal of Forms
15.7.1 The bidder will include the Supplier Diversity Compliance Evaluation Form(s), or the Application for Waiver and other form(s) as required above in the envelope containing the "Bidder's Statement of Qualifications", see Article 8.

15.8 Additional Bid/Proposer Information
15.8.1 The Contracting Officer reserves the right to request additional information regarding Supplier Diversity participation and supporting documentation from the apparent low bidder. The bidder shall respond in writing to the Contracting Officer within 24-hours (1 work day) of a request.

15.8.2 The Contracting Officer reserves the right to request additional information after the bidder has responded to prior 24 hour requests. This information may include follow up and/or clarification of the information previously submitted.

15.8.3 The Owner reserves the right to consider additional diverse subcontractor and supplier participation submitted by the bidder after bids are opened under the provisions within these contract documents that describe the Owner’s right to accept or reject subcontractors including, but not limited to, Article 16 below. The Owner may elect to waive the good faith effort requirement if such additional participation achieves the Supplier Diversity goal.

15.8.4 The Bidder shall provide the Owner information related to the Supplier Diversity participation included in the bidder’s proposal, including, but is not limited to, the complete Application for Waiver, evidence of diverse certification of participating firms, dollar amount of participation of diverse firms, information supporting a good faith effort as described in Article 15.6 above, and a list of all diverse firms that submitted bids to the Bidder with the diverse firm’s price and the name and the price of the firm awarded the scope of work bid by the diverse firm.

16. List of Subcontractors
16.1 If a list of subcontractors is required on the Bid for Lump Sum Contract Form, the bidders shall list the name, city and state of the firm(s) which will accomplish that portion of the contract requested in the space provided. This list is separate from both the list of diverse firms required in Article 15.2, and the complete list of subcontractors required in Article 10.1 of this document. Should the bidder choose to perform any of the listed portions of the work with its own forces, the bidder shall enter its own name, city and state in the space provided. If acceptance or non-acceptance of alternates will affect the designation of a subcontractor, the bidder shall provide that information on the bid form.

16.2 Failure of the bidder to supply the list of subcontractors required or the listing of more than one subcontractor for any category without designating the portion of the work to be performed by each, shall be grounds for the rejection of the bid. The bidder can petition the Owner to change a listed subcontractor within 48 hours of the bid opening. The Owner reserves the right to make the final determination on a petition to change a subcontractor. The Owner will consider factors such as clerical and mathematical bidding errors, listed subcontractor’s inability to perform the work for the bid used, etc. Any request to change a listed subcontractor shall include at a minimum, contractor’s bid sheet showing tabulation of the bid; all subcontractor bids with documentation of the time they were received by the contractor; and a letter from the listed subcontractor on their letterhead stating why they cannot perform the work if applicable. The Owner reserves the right to ask for additional information.

16.3 Upon award of the contract, the requirements of Article 10 of this document and Article 5 of the General Conditions of the Contract for Construction included in the contract documents will apply.
General Conditions

of the

Contract

for

Construction

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ARTICLE 1
GENERAL PROVISIONS

1.1 Basic Definitions
As used in the Contract Documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1.1.1 Owner
The Curators of the University of Missouri. The Owner may act through its Board of Curators or any duly authorized committee or representative thereof.

1.1.2 Contracting Officer
The Contracting Officer is the duly authorized representative of the Owner with the authority to execute contracts. Communications to the Contracting Officer shall be forwarded via the Owner's Representative.

1.1.3 Owner's Representative
The Owner’s Representative is authorized by the Owner as the administrator of the Contract and will represent the Owner during the progress of the Work. Communications from the Architect to the Contractor and from the Contractor to the Architect shall be through the Owner's Representative, unless otherwise indicated in the Contract Documents.

1.1.4 Architect
When the term "Architect" is used herein, it shall refer to the Architect or the Engineer specified and defined in the Contract for Construction or its duly authorized representative. Communications to the Architect shall be forwarded to the address shown in the Contract for Construction.

1.1.5 Contractor
The Contractor is the person or entity with whom the Owner has entered into the Contract for Construction. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

1.1.6 Subcontractor and Lower-tier Subcontractor
A Subcontractor is a person or organization who has a contract with the Contractor to perform any of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or its authorized representative. The term "Subcontractor" also is applicable to those furnishing materials to be incorporated in the Work whether work performed is at the Owner’s site or off site, or both. A lower-tier Subcontractor is a person or organization who has a contract with a Subcontractor or another lower-tier Subcontractor to perform any of the Work at the site. Nothing contained in the Contract Documents shall create contractual relationships between the Owner or the Architect and any Subcontractor or lower-tier Subcontractor of any tier.

1.1.7 Supplier Diversity Definitions
Businesses that fall into the Supplier Diversity classification shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more diverse suppliers as described below.

1. Minority Business Enterprises (MBE)
Minority Business Enterprise [MBE] shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more minorities as defined below or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more minorities as defined below, and whose management and daily business operations are controlled by one (1) or more minorities as defined herein.

.1 "African Americans", which includes persons having origins in any of the black racial groups of Africa.

.2 "Hispanic Americans", which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

.3 "Native Americans", which includes persons of American Indian, Eskimo, Aleut, or Native Hawaiian origin.

.4 "Asian-Pacific Americans", which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories of the Pacific, or the Northern Marinas.

.5 "Asian-Indian Americans", which includes persons whose origins are from India, Pakistan, or Bangladesh.

2 Women Business Enterprise (WBE)
Women Business Enterprise [WBE] shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more women or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more women, and whose management and daily business operations are controlled by one (1) or more women.

3 Veteran Owned Business
Veteran Owned Business shall mean an approved certified business concern which is at least fifty-one percent (51%) owned and controlled by one (1) or more Veterans or, in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more Veterans, and whose management and daily business operations are controlled by one (1) or more Veterans. Veterans must be certified by the appropriate federal agency responsible for veterans’ affairs.

4 Service Disabled Veteran Enterprise (SDVE)
Service Disabled Veteran Enterprise (SDVE) shall mean a business certified by the State of Missouri Office of Administration as a Service Disabled Veteran Enterprise, which is at least fifty-one percent (51%) owned and controlled by one (1) or more Serviced Disabled Veterans or,
in the case of any publicly-owned business, in which at least fifty-one percent (51%) of the stock of which is owned by one (1) or more Service Disabled Veterans, and whose management and daily business operations are controlled by one (1) or more Serviced Disabled Veterans.

.5 Disadvantaged Business Enterprise (DBE)
A Disadvantaged Business Enterprise (DBE) is a for-profit small business concern where a socially and economically disadvantaged individual owns at least 51% interest and also controls management and daily business operations. These firms can and also be referred to as Small Disadvantaged Businesses (SDB). Eligibility requirements for certification are stated in 49 CFR (Code of Federal Regulations), part 26, Subpart D.

U.S. citizens that are African-Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Also recognized as DBE’s are Historically Black Colleges and Universities (HBCU) and small businesses located in Federal HUB Zones.

To be regarded as economically disadvantaged, an individual must have a personal net worth that does not exceed $1.32 million. To be seen as a small business, a firm must meet Small Business Administration (SBA) size criteria (500 employees or less) and have average annual gross receipts not to exceed $22.41 million. To be considered a DBE/SDB, a small business owned and controlled by socially and/or economically disadvantaged individuals must receive DBE certification from one of the recognized Missouri state agencies to be recognized in this classification.

1.1.9 Work
Work shall mean supervision, labor, equipment, tools, material, supplies, incidentals operations and activities required by the Contract Documents or reasonably inferable by Contractor therefrom as necessary to produce the results intended by the Contract Documents in a safe, expeditious, orderly, and workmanlike manner, and in the best manner known to each respective trade.

1.1.10 Approved
The terms "approved", "equal to", "directed", "required", "ordered", "designated", "acceptable", "satisfactory", and similar words or phrases will be understood to have reference to action on the part of the Architect and/or the Owner's Representative.

1.1.11 Contract Documents
The Contract Documents consist of (1) the executed Contract for Construction, (2) these General Conditions of the Contract for Construction, (3) any Supplemental Conditions or Special Conditions identified in the Contract for Construction, (4) the Specifications identified in the Contract for Construction, (5) the Drawings identified in the Contract for Construction, (6) Addenda issued prior to the receipt of bids, (7) Contractor's bid addressed to Owner, including Contractor's completed Qualification Statement, (8) Contractor's Performance Bond and Contractor's Payment Bond, (9) Notice to Proceed, (10) and any other exhibits and/or post bid adjustments identified in the Contract for Construction, (11) Advertisement for Bid, (12) Information for Bidders, and (13) Change Orders issued after execution of the Contract. All other documents and technical reports and information are not Contract Documents, including without limitation, Shop Drawings, and Submittals.

1.1.12 Contract
The Contract Documents form the Contract and are the exclusive statement of agreement between the parties. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior representations or agreements, either written or oral. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and a Subcontractor or any lower-tier Subcontractor.

1.1.13 Change Order
The Contract may be amended or modified without invalidating the Contract, only by a Change Order, subject to the limitations in Article 7 and elsewhere in the Contract Documents. A Change Order is a written instrument signed by the Owner and the Contractor stating their agreement to a change in the Work, the amount of the adjustment to the Contract Sum, if any, and the extent of the adjustment to the Contract Time, if any. Agreement to any Change Order shall constitute a final settlement of all matters relating to the change in the work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments of the Contract sum, time and schedule.

1.1.14 Substantial Completion
The terms “Substantial Completion” or "substantially complete" as used herein shall be construed to mean the completion of the entire Work, including all submittals required under the Contract Documents, except minor items which in the opinion of the Architect, and/or the Owner's Representative will not interfere with the complete and satisfactory use of the facilities for the purposes intended.

1.1.15 Final Completion
The date when all punch list items are completed, including all closeout submittals and approval by the Architect is given to the Owner in writing.

1.1.16 Supplemental and Special Conditions
The terms “Supplemental Conditions” or “Special Conditions” shall mean the part of the Contract Documents which amend, supplement, delete from, or add to these General Conditions.

1.1.17 Day
The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

1.1.18 Knowledge.
The terms “knowledge,” “recognize” and “discover,” their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows or should know, recognizes or should recognize and discovers or should discover in exercising the care, skill, and diligence of a diligent and prudent contractor familiar with the work. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a diligent and prudent contractor familiar with the work.

1.1.19 Punch List
“Punch List” means the list of items, prepared in connection with the inspection of the Project by the Owner’s Representative or Architect in connection with Substantial Completion of the Work or a portion of the Work, which the Owner’s Representative or Architect has designated as remaining to be performed, completed or corrected before the Work will be accepted by the Owner.

1.1.20 Public Works Contracting Minimum Wage
The public works contracting minimum wage shall be equal to one hundred twenty percent of the average hourly wage in a particular locality, as determined by the Missouri economic research and information center within the department of economic development, or any successor agency.

1.2 Specifications and Drawings
1.2.1 The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction system, standards and workmanship and performance of related services for the Work identified in the Contract for Construction. Specifications are separated into titled divisions for convenience of reference only. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Such separation will not operate to make the Owner or the Architect an arbiter of labor disputes or work agreements.

1.2.2 The drawings herein referred to, consist of drawings prepared by the Architect and are enumerated in the Contract Documents.

1.2.3 Drawings are intended to show general arrangements, design, and dimensions of work and are partly diagrammatic. Dimensions shall not be determined by scale or rule. If figured dimensions are lacking, they shall be supplied by the Architect on the Contractor's written request to the Owner's Representative.

1.2.4 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complimentary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.2.5 In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of Work or (2) comply with the more stringent requirement; either or both in accordance with the Owner’s Representative’s interpretation. On the Drawings, given dimensions shall take precedence over scaled measurements and large scale drawings over small scale drawings. Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the Work site and shall be responsible for the correctness of such measurements. Any difference which may be found shall be submitted to the Owner’s Representative and Architect for resolution before proceeding with the Work. If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such change for the approval by the Owner’s Representative and Architect before making the change.

1.2.6 Data in the Contract Documents concerning lot size, ground elevations, present obstructions on or near the site, locations and depths of sewers, conduits, pipes, wires, etc., position of sidewalks, curbs, pavements, etc., and nature of ground and subsurface conditions have been obtained from sources the Architect believes reliable, but the Architect and Owner do not represent or warrant that this information is accurate or complete. The Contractor shall verify such data to the extent possible through normal construction procedures, including but not limited to contacting utility owners and by prospecting.

1.2.7 Only work included in the Contract Documents is authorized, and the Contractor shall do no work other than that described therein.

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1.2.8 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Contractor represents that it has performed its own investigation and examination of the Work site and its surroundings and satisfied itself before entering into this Contract as to:

1. conditions bearing upon transportation, disposal, handling, and storage of materials;
2. the availability of labor, materials, equipment, water, electrical power, utilities and roads;
3. uncertainties of weather, river stages, flooding and similar characteristics of the site;
4. conditions bearing upon security and protection of material, equipment, and Work in progress;
5. the form and nature of the Work site, including the surface and sub-surface conditions;
6. the extent and nature of Work and materials necessary for the execution of the Work and the remedying of any defects therein; and
7. the means of access to the site and the accommodations it may require and, in general, shall be deemed to have obtained all information as to risks, contingencies and other circumstances.
8. the ability to complete work without disruption to normal campus activities, except as specifically allowed in the contract documents.

The Owner assumes no responsibility or liability for the physical condition or safety of the Work site or any improvements located on the Work site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time concerning any failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph.

1.2.9 Drawings, specifications, and copies thereof furnished by the Owner are and shall remain the Owner’s property. They are not to be used on another project and, with the exception of one contract set for each party to the Contract, shall be returned to the Owner's Representative on request, at the completion of the Work.

1.3 Required Provisions Deemed Inserted

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein; and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the written application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 2

OWNER

2.1 Information and Services Required of the Owner

2.1.1 Permits and fees are the responsibility of the Contractor under the Contract Documents, unless specifically stated in the contract documents that the Owner will secure and pay for specific necessary approvals, easements, assessments, and charges required for construction, use or occupancy of permanent structures, or for permanent changes in existing facilities.

2.1.2 When requested in writing by the Contractor, information or services under the Owner's control, which are reasonably necessary to perform the Work, will be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

2.2 Owner's Right to Stop the Work

2.2.1 If the Contractor fails to correct Work which is not in strict accordance with the requirements of the Contract Documents or fails to carry out Work in strict accordance with the Contract Documents, the Owner's Representative may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work will not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. Owner’s lifting of Stop Work Order shall not prejudice Owner’s right to enforce any provision of this Contract.

2.3 Owner's Right to Carry Out the Work

2.3.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a seven (7) day period after receipt of a written notice from the Owner to correct such default or neglect, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect’s additional services and expenses made necessary by such default or neglect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to Owner. However, such notice shall be waived in the event of an emergency with the potential for property damage or the endangerment of students, faculty, staff, the public or construction personnel, at the sole discretion of the Owner.

2.3.2 In the event the Contractor has not satisfactorily completed all items on the Punch List within thirty (30) days of its receipt, the Owner reserves the right to complete the Punch List without further notice to the Contractor or its

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surety. In such case, Owner shall be entitled to deduct from payments then or thereafter due the Contractor the cost of completing the Punch List items, including compensation for the Architect’s additional services. If payments then or thereafter due Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to Owner.

2.4 Extent of Owner Rights
2.4.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

2.4.2 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3
CONTRACTOR

3.1 Contractor’s Warranty
3.1.1 The Contractor warrants all equipment and materials furnished, and work performed, under this Contract, against defective materials and workmanship for a period of twelve months after acceptance as provided in this Contract, unless a longer period is specified, regardless of whether the same were furnished or performed by the Contractor or any Subcontractors of any tier. Upon written notice from the Owner of any breach of warranty during the applicable warranty period due to defective material or workmanship, the affected part or parts thereof shall be repaired or replaced by the Contractor at no cost to the Owner. Should the Contractor fail or refuse to make the necessary repairs, replacements, and tests when requested by the Owner, the Owner may perform, or cause the necessary work and tests to be performed, at the Contractor’s expense, or exercise the Owner’s rights under Article 14.

3.1.2 Should one or more defects mentioned above appear within the specified period, the Owner shall have the right to continue to use or operate the defective part or apparatus until the Contractor makes repairs or replacements or until such time as it can be taken out of service without loss or inconvenience to the Owner.

3.1.3 The above warranties are not intended as a limitation, but are in addition to all other express warranties set forth in this Contract and such other warranties as are implied by law, custom, and usage of trade. The Contractor, and its surety or sureties, if any, shall be liable for the satisfaction and full performance of the warranties set forth herein.

3.1.4 Neither the final payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner, nor expiration of warranty stated herein, will constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any responsibility for non-conforming work. The Contractor shall immediately remedy any defects in the Work and pay for any damage to other Work resulting therewith on written notice from the Owner. Should the Contractor fail or refuse to remedy the non-conforming work, the Owner may perform, or cause to be performed the work necessary to bring the work into conformance with the Contract Documents at the Contractor’s expense.

3.1.5 The Contractor agrees to defend, indemnify, and save harmless The Curators of the University of Missouri, their Officers, Agents, Employees and Volunteers, from and against all loss or expense from any injury or damages to property of others suffered or incurred on account of any breach of the aforesaid obligations and covenants. The Contractor agrees to investigate, handle, respond to and provide defense for and defend against any such liability, claims, and demands at the sole expense of the Contractor, or at the option of the University, agrees to pay to or reimburse the University for the defense costs incurred by the University in connection with any such liability claims, or demands. The parties hereto understand and agree that the University is relying on, and does not waive or intend to waive by any provision of this Contract, any monetary limitations or any other rights, immunities, and protections provided by the State of Missouri, as from time to time amended, or otherwise available to the University, or its officers, employees, agents or volunteers.

3.2 Compliance with Laws, Permits, Regulations and Inspections
3.2.1 The Contractor shall, without additional expense to the Owner, comply with all applicable laws, ordinances, rules, statutes, and regulations (collectively referred to as “Laws”).

3.2.2 Since the Owner is an instrumentality of the State of Missouri, municipal, or political subdivision, ordinances, zoning ordinances, and other like ordinances are not applicable to construction on the Owner’s property, and the Contractor will not be required to submit plans and specifications to any municipal or political subdivision authority to obtain construction permits or any other licenses or permits from or submit to, inspection by any municipality or political subdivision relating to the construction on the Owner's property, unless required by the Owner in these Contract Documents or otherwise in writing.
3.2.3 All fees, permits, inspections, or licenses required by municipality or political subdivision for operation on property not belonging to the Owner, shall be obtained by and paid for by the Contractor. The Contractor, of its own expense, is responsible to ensure that all inspections required by said permits or licenses on property, easements, or utilities not belonging to the Owner are conducted as required therein. All connection charges, assessments or transportation fees as may be imposed by any utility company or others are included in the Contract Sum and shall be the Contractor’s responsibility, as stated in 2.1.1 above.

3.2.4 If the Contractor has knowledge that any Contract Documents are at variance with any Laws, including Americans with Disabilities Act – Standards for Accessible Design, ordinances, rules, regulations or codes applying to the Work, Contractor shall promptly notify the Architect and the Owner’s Representative, in writing, and any necessary changes will be adjusted as provided in Contract Documents. However, it is not the Contractor’s primary responsibility to ascertain that the Contract Documents are in accordance with applicable Laws, unless such Laws bear upon performance of the Work.

3.3 Anti-Kickback
3.3.1 No member or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

3.3.2 No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction, or material supply contract or any Subcontract of any tier in connection with the construction of the Work shall have a financial interest in this Contract or in any part thereof, any material supply contract, Subcontract of any tier, insurance contract, or any other contract pertaining to the Work.

3.4 Supervision and Construction Procedures
3.4.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract. The Contractor shall supply sufficient and competent supervision and personnel, and sufficient material, plant, and equipment to prosecute the Work with diligence to ensure completion thereof within the time specified in the Contract Documents, and shall pay when due any laborer, Subcontractor of any tier, or supplier.

3.4.2 The Contractor, if an individual, shall give the Work an adequate amount of personal supervision, and if a partnership or corporation or joint venture the Work shall be given an adequate amount of personal supervision by a partner or executive officer, as determined by the Owner's Representative.

3.4.3 The Contractor and each of its Subcontractors of any tier shall submit to the Owner such schedules of quantities and costs, progress schedules in accordance with 3.17.2 of this document, payrolls, reports, estimates, records, and other data as the Owner may request concerning Work performed or to be performed under the Contract.

3.4.4 The Contractor shall be represented at the site by a competent superintendent from the beginning of the Work until its final acceptance, whenever contract work is being performed, unless otherwise permitted in writing by the Owner's Representative. The superintendent for the Contractor shall exercise general supervision over the Work and such superintendent shall have decision making authority of the Contractor. Communications given to the superintendent shall be binding as if given to the Contractor. The superintendent shall not be changed by the contractor without approval from the Owner’s Representative.

3.4.5 The Contractor shall establish and maintain a permanent bench mark to which access may be had during progress of the Work, and Contractor shall establish all lines and levels, and shall be responsible for the correctness of such. Contractor shall be fully responsible for all layout work for the proper location of Work in strict accordance with the Contract Documents.

3.4.6 The Contractor shall establish and be responsible for wall and partition locations. If applicable, separate contractors shall be entitled to rely upon these locations and for setting their sleeves, openings, or chases.

3.4.7 The Contractor’s scheduled outage/tie-in plan, time, and date for any utilities is subject to approval by the Owner’s Representative. Communication with the appropriate entity and planning for any scheduled outage/tie-in of utilities shall be the responsibility of the Contractor. Failure of Contractor to comply with the provisions of this Paragraph shall cause Contractor to forfeit any right to an adjustment of the Contract Sum or Contract Time for any postponement, rescheduling or other delays ordered by Owner in connection with such Work. The Contractor shall follow the following procedures for all utility outages/tie-ins or disruption of any building system:

.1 All shutting of valves, switches, etc., shall be by the Owner's personnel.
.2 Contractor shall submit its preliminary outage/tie-in schedule with its baseline schedule.
.3 The Contractor shall request an outage/tie-in meeting at least two weeks before the outage/tie-in is required.
.4 The Owner's Representative will schedule an outage/tie-in meeting at least one week prior to the outage/tie-in.

3.4.8 The Contractor shall coordinate all Work so there shall be no prolonged interruption of existing utilities, systems and equipment of Owner. Any existing plumbing, heating, ventilating, air conditioning, or electrical disconnection necessary, which affect portions of this construction or building or any other building, must be scheduled with the Owner's Representative to avoid any disruption of operation within the building under construction or other buildings or utilities. In no case shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities, either intentionally or accidentally, shall not relieve the Contractor from repairing and restoring the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

3.4.9 The Contractor shall be responsible for repair of damage to property on or off the project occurring during construction of project, and all such repairs shall be made to meet code requirements or to the satisfaction of the Owner's Representative if code is not applicable.

3.4.10 The Contractor shall be responsible for all shoring required to protect its work or adjacent property and shall pay for any damage caused by failure to shore or by improper shoring or by failure to give proper notice. Shoring shall be removed only after completion of permanent supports.

3.4.11 The Contractor shall maintain at his own cost and expense, adequate, safe and sufficient walkways, platforms, scaffolds, ladders, hoists and all necessary, proper, and adequate equipment, apparatus, and appliances useful in carrying on the Work and which are necessary to make the place of Work safe and free from avoidable danger for students, faculty, staff, the public and construction personnel, and as may be required by safety provisions of applicable laws, ordinances, rules, regulations and building and construction codes.

3.4.12 During the performance of the Work, the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences, and other devices appropriately located on site which shall give proper and understandable warning to all persons of danger of entry onto land, structure, or equipment, within the limits of the Contractor’s work area.

3.4.13 The Contractor shall pump, bail, or otherwise keep any general excavations free of water. The Contractor shall keep all areas free of water before, during and after concrete placement. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials installed, or to be installed by him.

3.4.14 The Contractor shall be responsible for care of the Work and must protect same from damage of defacement until acceptance by the Owner. All damaged or defaced Work shall be repaired or replaced to the Owner's satisfaction, without cost to the Owner.

3.4.15 When requested by the Owner's Representative, the Contractor, at no extra charge, shall provide scaffolds or ladders in place as may be required by the Architect or the Owner for examination of Work in progress or completed.

3.4.16 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors of any tier and their agents and employees, and any entity or other persons performing portions of the Work.

3.4.17 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner's Representative or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.4.18 The Contractor shall be responsible for inspection of portions of the Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.5 Use of Site
3.5.1 The Contractor shall limit operations and storage of material to the area within the Work limit lines shown on Drawings, except as necessary to connect to exiting utilities, shall not encroach on neighboring property, and shall exercise caution to prevent damage to existing structures.

3.5.2 Only materials and equipment, which are to be used directly in the Work, shall be brought to and stored on the Work site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Work site. Protection of construction materials and equipment stored at the Work site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.
3.5.3 No project signs shall be erected without the written approval of the Owner's Representative.

3.5.4 The Contractor shall ensure that the Work is at all times performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. Particular attention shall be paid to access for emergency vehicles, including fire trucks. Wherever there is the possibility of interfering with normal emergency vehicle operations, Contractor shall obtain permission from both campus and municipal emergency response entities prior to limiting any access. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall not interfere with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work or (2) the Work in the event of partial occupancy. Contractor shall assume full responsibility for any damage to the property comprising the Work or to the owner or occupant of any adjacent land or areas resulting from the performance of the Work.

3.5.5 The Contractor shall not permit any workers to use any existing facilities at the Work site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by Owner. The Contractor, Subcontractors of any tier, suppliers and employees shall comply with instructions or regulations of the Owner's Representative governing access to, operation of, and conduct while in or on the premises and shall perform all Work required under the Contract Documents in such a manner as not to unreasonably interrupt or interfere with the conduct of Owner’s operations. Any request for Work, a suspension of Work or any other request or directive received by the Contractor from occupants of existing buildings shall be referred to the Owner’s Representative for determination.

3.5.6 The Contractor and the Subcontractor of any tier shall have its' name, acceptable abbreviation or recognizable logo and the name of the city and state of the mailing address of the principal office of the company, on each motor vehicle and motorized self-propelled piece of equipment which is used in connection with the project. The signs are required on such vehicles during the time the Contractor is working on the project.

3.6 Review of Contract Documents and Field Conditions by Contractor

3.6.1 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Architect and Owner and shall at once report in writing to the Architect and Owner's Representative any errors, inconsistencies or omissions discovered. If the Contractor performs any construction activity which it knows or should have known involves a recognized error, inconsistency or omission in the Contract Documents without such written notice to the Architect and Owner’s Representative, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

3.6.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported in writing to the Architect and Owner’s Representative within twenty-four (24) hours. During the progress of work, Contractor shall verify all field measurements prior to fabrication of building components or equipment, and proceed with the fabrication to meet field conditions. Contractor shall consult all Contract Documents to determine the exact location of all work and verify spatial relationships of all work. Any question concerning said location or spatial relationships shall be submitted to the Owner's Representative. Specific locations for equipment, pipelines, ductwork and other such items of work, where not dimensioned on plans, shall be determined in consultation with Owner's Representative and Architect. Contractor shall be responsible for the proper fitting of the Work in place.

3.6.3 The Contractor shall provide, at the proper time, such material as required for support of the Work. If openings or chases are required, whether shown on Drawings or not, the Contractor shall see they are properly constructed. If required openings or chases are omitted, the Contractor shall cut them at the Contractor's expense, but only as directed by the Architect, through the Owner Representative.

3.6.4 Should the Contract Documents fail to particularly describe materials or goods to be used, it shall be the duty of the Contractor to inquire of the Architect and the Owner's Representative what is to be used and to supply it at the Contractor's expense, or else thereafter replace it to the Owner’s Representative’s satisfaction. At a minimum, the Contractor shall provide the quality of materials as generally specified throughout the Contract Documents.

3.7 Cleaning and Removal

3.7.1 The Contractor shall keep the Work site and surrounding areas free from accumulation of waste materials, rubbish, debris, and dirt resulting from the Work and shall
clean the Work site and surrounding areas as requested by the Architect and the Owner's Representative, including mowing of grass greater than 6 inches high. The Contractor shall be responsible for the cost of clean up and removal of debris from premises. The building and premises shall be kept clean, safe, in a workmanlike manner, and in compliance with OSHA standards at all times. At completion of the Work, the Contractor shall remove from and about the Work site tools, construction equipment, machinery, fencing, and surplus materials. Further, at the completion of the work, all dirt, stains, and smudges shall be removed from every part of the building, all glass in doors and windows shall be washed, and entire Work shall be left broom clean in a finished state ready for occupancy. The Contractor shall advise his Subcontractors of any tier of this provision, and the Contractor shall be fully responsible for leaving the premises in a finished state ready for use to the satisfaction of the Owner's Representative. If the Contractor fails to comply with the provisions of this paragraph, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.8 Cutting and Patching

3.8.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

3.8.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.8.3 If the Work involves renovation and/or alteration of existing improvements, Contractor acknowledges that cutting and patching of the Work is essential for the Work to be successfully completed. Contractor shall perform any cutting, altering, patching, and/or fitting of the Work necessary for the Work and the existing improvements to be fully integrated and to present the visual appearance of an entire, completed, and unified project. In performing any Work which requires cutting or patching, Contractor shall use its best efforts to protect and preserve the visual appearance and aesthetics of the Work to the reasonable satisfaction of both the Owner's Representative and Architect.

3.9 Indemnification

3.9.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, the Architect, Architect’s consultants, and the agents, employees, representatives, insurers and re-insurers of any of the foregoing (hereafter collectively referred to as the “Indemnites”) from and against claims, damages (including loss of use of the Work itself), punitive damages, penalties and civil fines unless expressly prohibited by law, losses and expenses, including, but not limited to, attorneys’ fees, arising out of or resulting from performance of the Work to the extent caused in whole or in part by negligent acts or omissions or other fault of Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by the negligent acts or omissions or other fault of a party indemnified hereunder. The Contractor’s obligations hereunder are in addition to and shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that the Owner may possess. If one or more of the Indemnites demand performance by the Contractor of obligations under this paragraph or other provisions of the Contract Documents and if Contractor refuses to assume or perform, or delays in assuming or performing Contractor’s obligations, Contractor shall pay each Indemnitee who has made such demand its respective attorneys’ fees, costs, and other expenses incurred in enforcing this provision. The defense and indemnity required herein shall be a binding obligation upon Contractor whether or not an Indemnitee has made such demand. Even if a defense is successful to a claim or demand for which Contractor is obligated to indemnify the Indemnities from under this Paragraph, Contractor shall remain liable for all costs of defense.

3.9.2 The indemnity obligations of Contractor under this Section 3.9 shall survive termination of this Contract or final payment thereunder. In the event of any claim or demand made against any party which is entitled to be indemnified hereunder, the Owner may in its sole discretion reserve, return or apply any monies due or to become due the Contractor under the Contract for the purpose of resolving such claims; provided, however, that the Owner may release such funds if the Contractor provides the Owner with reasonable assurance of protection of the Owner’s interests. The Owner shall in its sole discretion determine if such assurances are reasonable. Owner reserves the right to control the defense and settlement of any claim, action or proceeding which Contractor has an obligation to indemnify the Indemnities against under Paragraph 3.9.1.

3.9.3 In claims against any person or entity indemnified under this Section 3.9 by an employee of the Contractor, a Subcontractor of any tier, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.9 shall not be limited by a limitation on amount or type of

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damages, compensation or benefits payable by or for the Contractor or a Subcontractor of any tier under workers’ or workmen’s compensation acts, disability benefit acts or other employee benefit acts.

3.9.4 The obligations of the Contractor under Paragraph 3.9.1 shall not extend to the liability of the Architect, his agents or employees, arising out of the preparation and approval of maps, drawings, opinions, reports, surveys, Change Orders, designs, or Specifications.

3.10 Patents
3.10.1 The Contractor shall hold and save harmless the Owner and its officers, agents, servants, and employees from liability of any nature or kind, including cost and expense, for, or on account of, any patented or otherwise protected invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.

3.10.2 If the Contractor uses any design, device, or material covered by letters patent or copyright, he shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device, or material. It is mutually agreed and understood, without exception, that the Contract Sum includes and the Contractor shall pay all royalties, license fees or costs arising from the use of such design, device, or material in any way involved in the Work. The Contractor and/or sureties shall indemnify and save harmless the Owner from any and all claims for infringement by reason of the use of such patented or copyrighted design, device, or material or any trademark or copyright in connection with Work agreed to be performed under this Contract and shall indemnify the Owner for any cost, expense, or damage it may be obligated to pay by reason of such infringement at any time during the prosecution of the Work or after completion of the Work.

3.11 Materials, Labor, and Workmanship
3.11.1 Materials and equipment incorporated into the Work shall strictly conform to the Contract Documents and representations and approved Samples provided by Contractor and shall be of the most suitable grade of their respective kinds for their respective uses, and shall be fit and sufficient for the purpose intended, merchantable, of good new material and workmanship, and free from defect. Workmanship shall be in accordance with the highest standard in the industry and free from defect in strict accordance with the Contract Documents.

3.11.2 Materials and fixtures shall be new and of latest design unless otherwise specified, and shall provide the most efficient operating and maintenance costs to the Owner. All Work shall be performed by competent workers and shall be of best quality.

3.11.3 The Contractor shall carefully examine the Contract Documents and shall be responsible for the proper fitting of his material, equipment, and apparatus into the building.

3.11.4 The Contractor shall base his bid only on the Contract Documents.

3.11.5 Materials and workmanship shall be subject to inspection, examination, and test by the Architect and the Owner's Representative at any and all times during manufacture, installation, and construction of any of them, at places where such manufacture, installation, or construction is performed.

3.11.6 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.11.7 Unless otherwise specifically noted, the Contractor shall provide and pay for supervision, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

3.11.8 Substitutions
3.11.8.1 A substitution is a Contractor proposal of an alternate product or method in lieu of has been specified or shown in the Contract Documents, which is not an “or equal” as set forth in Section 3.12.1.

3.11.8.2 Contractor may make a proposal to the Architect and the Owner’s Representative to use substitute products or methods as set forth herein, but the Architect's and the Owner’s Representative’s decision concerning acceptance of a substitute shall be final. The Contractor must do so in writing and setting forth the following:

.1 Full explanation of the proposed substitution and submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation of the substitution.

.2 Reasons the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable.

.3 The adjustment, if any, in the Contract Sum, in the event the substitution is acceptable.

.4 The adjustment, if any, in the time of completion of the Contract and the construction schedule in the event the substitution is acceptable.

.5 An affidavit stating that (a) the proposed substitution conforms to and meets all of the
Contract Documents, except as specifically disclosed and set forth in the affidavit and (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect. Proposals for substitutions shall be submitted to the Architect and Owner’s Representative in sufficient time to allow the Architect and Owner’s Representative no less than ten (10) working days for review. No substitution will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated herein.

3.11.8.3 Substitutions may be rejected without explanation in Owner’s sole discretion and will be considered only under one or more of the following conditions:

1. Required for compliance with interpretation of code requirements or insurance regulations then existing;
2. Unavailability of specified products, through no fault of the Contractor;
3. Material delivered fails to comply with the Contract Documents;
4. Subsequent information discloses inability of specified products to perform properly or to fit in designated space;
5. Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required; or
6. When in the judgment of the Owner or the Architect, a substitution would be substantially to the Owner's best interests, in terms of cost, time, or other considerations.

3.11.8.4 Whether or not any proposed substitution is accepted by the Owner or the Architect, the Contractor shall reimburse the Owner for any fees charged by the Architect or other consultants for evaluating each proposed substitute.

3.12 Approved Equal

3.12.1 Whenever in the Contract Documents any article, appliance, device, or material is designated by the name of a manufacturer, vendor, or by any proprietary or trade name, the words "or approved equal," shall automatically follow and shall be implied unless specifically indicated otherwise. The standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner’s Representative and the Architect they are equal in design, appearance, spare parts availability, strength, durability, usefulness, serviceability, operation cost, maintenance cost, and convenience for the purpose intended. Any general listings of approved manufacturers in any Contract Document shall be for informational purposes only and it shall be the Contractor’s sole responsibility to ensure that any proposed “or equal” complies with the requirements of the Contract Documents.

3.12.2 The Contractor shall submit to Architect and Owner’s Representative a written and full description of the proposed “or equal” including all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and similar information demonstrating that the proposed “or equal” strictly complies with the Contract Documents. The Architect or Owner’s Representative shall take appropriate action with respect to the submission of a proposed “or equal” item. If Contractor fails to submit proposed “or equals” as set forth herein, it shall waive any right to supply such items. The Contract Sum and Contract Time shall not be adjusted as a result of any failure by Contractor to submit proposed “or equals” as provided for herein. All documents submitted in connection with preparing an “or equal” shall be clearly and obviously marked as a proposed “or equal” submission.

3.12.3 No approvals or action taken by the Architect or Owner’s Representative shall relieve Contractor from its obligation to ensure that an “or equal” article, appliance, devise or material strictly complies with the requirements of the Contract Documents. Contractor shall not propose “or equal” items in connection with Shop Drawings or other Submittals, and Contractor acknowledges and agrees that no approvals or action taken by the Architect or Owner’s Representative with respect to Shop Drawings or other Submittals shall constitute approval of any “or equal” item or relieve Contractor from its sole and exclusive responsibility. Any changes required in the details and dimensions indicated in the Contract Documents for the incorporation or installation of any “or equal” item supplied by the Contractor shall be properly made and approved by the Architect at the expense of the Contractor. No ‘or equal’ items will be permitted for components of extensions to existing systems when, in the opinion of the Architect, the named manufacturer must be provided in order to ensure compatibility with the existing systems, including, but not limited to, mechanical systems, electrical systems, fire alarms, smoke detectors, etc. No action will be taken by the Architect with respect to proposed “or equal” items prior to receipt of bids, unless otherwise noted in the Special Conditions.

3.13 Shop Drawings, Product Data, Samples, and Coordination Drawings/BIM Models

3.13.1 Shop Drawings are drawings, diagrams, schedules and other data specifically prepared for the Work by the Contractor or a Subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
3.13.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.13.3 Samples are physical samples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.13.4 Coordination Drawings are drawings for the integration of the Work, including work first shown in detail on shop drawings or product data. Coordination drawings show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination Drawings are the responsibility of the contractor and are submitted for informational purposes. The Special Conditions will state whether coordination drawings are required. BIM models may be used for coordination in lieu of coordination drawings at the contractor’s discretion, unless required in the Special Conditions. The final coordination drawings/BIM Model will not change the contract documents, unless approved by a fully executed change order describing the specific modifications that are being made to the contract documents.

3.13.5 Shop Drawings, Coordination Drawings/BIM Models, Product Data, Samples and similar submittals (collectively referred to as “Submittals”) are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

3.13.6 The Contractor shall schedule submittal of Shop Drawings and Product Data to the Architect so that no delays will result in delivery of materials and equipment, advising the Architect of priority for checking of Shop Drawings and Product Data, but a minimum of two weeks shall be provided for this purpose. Because time is of the essence in this contract, unless noted otherwise in the Special Conditions or Technical Specifications, all submittals, shop drawings and samples must be submitted as required to maintain the contractor’s plan for proceeding, but must be submitted within 90 days of the Notice To Proceed. If Contractor believes that this milestone is unreasonable for any submittal, Contractor shall request an extension of this milestone, within 60 days of Notice To Proceed, for each submittal that cannot meet the milestone. The request shall contain a reasonable explanation as to why the 90 day milestone is unrealistic, and shall specify a date on which the submittal will be transmitted, for approval by the Owner’s Representative. Failure of the Contractor to comply with this section may result in delays in the submittal approval process and/or charges for expediting approval, both of which will be the responsibility of the Contractor.

3.13.7 The Contractor, at its own expense, shall submit Samples required by the Contract Documents with reasonable promptness as to cause no delay in the Work or the activities of separate contractors and no later than twenty (20) days before materials are required to be ordered for scheduled delivery to the Work site. Samples shall be labeled to designate material or products represented, grade, place of origin, name of producer, name of Contractor and the name and number of the Owner’s project. Quantities of Samples shall be twice the number required for testing so that Architect can return one set of the Samples. Materials delivered before receipt of Architect’s approval may be rejected by Architect and in such event, Contractor shall immediately remove all such materials from the Work site. When requested by Architect or Owner’s Representative, samples of finished masonry and field applied paints and finishes shall be located as directed and shall include sample panels built at the site of approximately twenty (20) square feet each.

3.13.8 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect. Such Work shall be in accordance with approved submittals.

3.13.9 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents such Submittals strictly comply with the requirements of the Contract Documents and that the Contractor has determined and verified field measurements and field construction criteria related thereto, that materials are fit for their intended use and that the fabrication, shipping, handling, storage, assembly and installation of all materials, systems and equipment are in accordance with best practices in the industry and are in strict compliance with any applicable requirements of the Contract Documents. Contractor shall also coordinate each Submittal with other Submittals.

3.13.10 Contractor shall be responsible for the correctness and accuracy of the dimensions, measurements and other information contained in the Submittals.

3.13.11 Each Submittal will bear a stamp or specific indication that the Submittal complies with the Contract Documents and Contractor has satisfied its obligations under the Contract Documents with respect to Contractor’s review and approval of that Submittal. Each Submittal shall bear the signature of the representative of Contractor who approved the Submittal, together with the Contractor’s name, Owner’s name, number of the Project, and the item name and specification section number.

3.13.12 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data,
Samples or similar submittals. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof. Specifically, but not by way of limitation, Contractor acknowledges that Architect's approval of Shop Drawings shall not relieve Contractor for responsibility for errors and omissions in the Shop Drawings since Contractor is responsible for the correctness of dimensions, details and the design of adequate connections and details contained in the Shop Drawings.

3.13.13 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous Submittals.

3.13.14 The Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the Shop Drawing is prepared and, if required by the Architect or applicable Laws, by a licensed engineer or other design professional.

3.14 Record Drawings

3.14.1 The Contractor shall maintain a set of Record Drawings on site in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show: (1) bidding addendums, (2) executed change orders, (3) deviations from the Drawings made during construction; (4) details in the Work not previously shown; (5) changes to existing conditions or existing conditions found to differ from those shown on any existing drawings; (6) the actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings, and stub-outs; and (7) such other information as either Owner or Architect may reasonably request. The prints for Record Drawing use will be a set of "blue line" prints provided by Architect to Contractor at the start of construction. Upon Substantial Completion of the Work, Contractor shall deliver all Record Drawings to Owner and Architect for approval. If not approved, Contractor shall make the revisions requested by Architect or Owner's Representative. Final payment and any retainage shall not be due and owing to Contractor until the final Record Drawings marked by Contractor as required above are delivered to Owner.

3.15 Operating Instructions and Service Manuals

3.15.1 The Contractor shall submit four (4) volumes of operating instructions and service manuals to the Architect before completing 50% of the adjusted contract amount. Payments beyond 50% of the adjusted contract amount may be withheld until all operating instructions and service manuals are received. The operating instructions and service manuals shall contain:

.1 Start-up and Shutdown Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available, they may be incorporated into the operating manual for reference.

.2 Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.

.3 Equipment List: List of all major equipment as installed shall include model number, capacities, flow rate, and name-plate data.

.4 Service Instructions: The Contractor shall be required to provide the following information for all pieces of equipment.

(a) Recommended spare parts including catalog number and name of local suppliers or factory representative.

(b) Belt sizes, types, and lengths.

(c) Wiring diagrams.

.5 Manufacturer's Certificate of Warranty: Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year from the date of Substantial Completion. Where longer period is required by the Contract Documents, the longer period shall govern.

.6 Parts catalogs: For each piece of equipment furnished, a parts catalog or similar document shall be provided which identifies the components by number for replacement ordering.

3.15.2 Submission

.1 Manuals shall be bound into volumes of standard 8 1/2" x 11" hard binders. Large drawings too bulky to be folded into 8 1/2" x 11" shall be separately bound or folded and in brown envelopes, cross-referenced and indexed with the manuals.

.2 The manuals shall identify the Owner's project name, project number, and include the name and address of the Contractor and major Subcontractors of any tier who were involved with the activity described in that particular manual.

3.16 Taxes

3.16.1 The Contractor shall pay all applicable sales, consumer, use, and similar taxes for the Work which are legally enacted when the bids are received, whether or not yet effective or scheduled to go into effect. However, certain purchases by the Contractor of materials incorporated in or consumed in the Work are exempt from certain sales tax pursuant to RSMo § 144.062. The Contractor shall be issued a Project Tax Exemption Certificate for this Work to obtain the benefits of RSMo § 144.062.

3.16.2 The Contractor shall furnish this certificate to all subcontractors, and any person or entity purchasing materials
for the Work shall present such certificate to all material suppliers as authorization to purchase, on behalf of the Owner, all tangible personal property and materials to be incorporated into or consumed in the Work and no other on a tax-exempt basis. Such suppliers shall provide to the purchasing party invoices bearing the name of the exempt entity and the project identification number. Nothing in this section shall be deemed to exempt from any sales or similar tax the purchase of any construction machinery, equipment or tools used in construction, repairing or remodeling facilities for the Owner. All invoices for all personal property and materials purchased under a Project Tax Exemption Certificate shall be retained by the Contractor for a period of five years and shall be subject to audit by the Director of Revenue.

3.16.3 Any excess resalable tangible personal property or materials which were purchased for the project under this Project Tax Exemption Certificate but which were not incorporated into or consumed in the Work shall either be returned to the supplier for credit or the appropriate sales or use tax on such excess property or materials shall be reported on a return and paid by such purchasing party not later than the due date of the purchasing party’s Missouri sales or use tax return following the month in which it was determined that the materials were not used in the Work.

3.16.4 If it is determined that sales tax is owed by the Contractor on property and materials due to the failure of the Owner to revise the certificate expiration date to cover the applicable date of purchase, Owner shall be liable for the tax owed.

3.16.5 The Owner shall not be responsible for any tax liability due to Contractor’s neglect to make timely orders, payments, etc. or Contractor’s misuse of the Project Tax Exemption Certificate. Contractor represents that the Project Tax Exemption Certificate shall be used in accordance with RSMo § 144.062 and the terms of the Project Tax Exemption Certificate. Contractor shall indemnify the Owner for any loss or expense, including but not limited to, reasonable attorneys’ fees, arising out of Contractor’s use of the Project Tax Exemption Certificate.

3.17 Contractor’s Construction Schedules

3.17.1 The Contractor, within fifteen (15) days after the issuance of the Notice to Proceed, shall prepare and submit for the Owner's and Architect's information Contractor's construction schedule for the Work and shall set forth interim dates for completion of various components of the Work and Work Milestone Dates as defined herein. The schedule shall not exceed time limits current under the Contract Documents, shall be revised on a monthly basis or as requested by the Owner’s Representative as required by the conditions of the Work, and shall provide for expeditious and practicable execution of the Work. The Contractor shall conform to the most recent schedule.

3.17.2 The construction schedule shall be in a detailed format satisfactory to the Owner’s Representative and the Architect and in accordance with the detailed schedule requirements set forth in this document and the Special Conditions. If the Owner’s Representative or Architect has a reasonable objection to the schedule submitted by Contractor, the construction schedule shall be promptly revised by the Contractor. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays.

3.17.3 As time is of the essence to this contract, the University expects that the Contractor will take all necessary steps to insure that the project construction schedule shall be prepared in accordance with the specific requirements of the Special Conditions to this contract. At a minimum, contractor shall comply with the following:

.1 The schedule shall be prepared using Primavera P3, Oracle P6, Microsoft Project or other software acceptable to the Owner’s Representative.

.2 The schedule shall be prepared and maintained in CPM format, in accordance with Construction CPM Scheduling, published by the Associated General Contractors of America (AGC).

.3 Prior to submittal to the Owner’s Representative for review, Contractor shall obtain full buy-in to the schedule from all major subcontractors, in writing if so requested by Owner’s Representative.

.4 Schedule shall be updated, in accordance with Construction CPM Scheduling, published by the AGC, on a monthly basis at minimum, prior to, and submitted with, the monthly pay application or as requested by the Owner’s Representative.

.5 Along with the update the Contractor shall submit a narrative report addressing all changes, delays and impacts, including weather to the schedule during the last month, and explain how the end date has been impacted by same.

.6 The submission of the updated certifies that all delays and impacts that have occurred on or to the project during the previous month have been factored into the update and are fully integrated into the schedule and the projected completion date.

Failure to comply with any of these requirements will be considered a material breach of this contract. See Special Conditions for detailed scheduling requirements.

3.17.4 In the event the Owner’s Representative or Architect determines that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the
right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, facilities, (3) expediting delivery of materials, and (4) other similar measures (hereinafter referred to collectively as Extraordinary Measures). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum concerning Extraordinary Measures required by the Owner under or pursuant to this Paragraph 3.17.3. The Owner may exercise the rights furnished the Owner under or pursuant to this Paragraph 3.17.3 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT

4.1 Rights of the Owner
4.1.1 The Owner's Representative will administer the Construction Contract. The Architect will assist the Owner's Representative with the administration of the Contract as indicated in these Contract Documents.

4.1.2 If, in the judgment of the Owner's Representative, it becomes necessary to accelerate the work, the Contractor, when directed by the Owner's Representative in writing, shall cease work at any point and transfer its workers to such point or points and execute such portions of the work as may be required to enable others to hasten and properly engage and carry out the work, all as directed by the Owner's Representative. The additional cost of accelerating the work, if any, will be borne by the Owner, unless the Contractor's work progress is behind schedule as shown on the most recent progress schedule.

4.1.3 If the Contractor refuses, for any reason, to proceed with what the Owner believes to be contract work, the Owner may issue a Construction Directive, directing the Contractor to proceed. Contractor shall be obligated to promptly proceed with this work. If Contractor feels that it is entitled to additional compensation for this work, it may file a claim for additional compensation and/or time, in accordance with 4.4 of this document.

4.1.4 The Owner's Representative, may, by written notice, require a Contractor to remove from involvement with the Work, any of Contractor's personnel or the personnel of its Subcontractors of any tier whom the Owner's Representative may deem abusive, incompetent, careless, or a hindrance to proper and timely execution of the Work. The Contractor shall comply with such notice promptly, but without detriment to the Work or its progress.

4.1.5 The Owner's Representative will schedule Work status meetings that shall be attended by representatives of the Contractor and appropriate Subcontractors of any tier. Material suppliers shall attend status meetings if required by the Owner's Representative. These meetings shall include preconstruction meetings.

4.1.6 The Owner does not allow smoking on University property.

4.2 Rights of the Architect
4.2.1 The Architect will interpret requirements of the Contract Documents with respect to the quality, quantity and other technical requirements of the Work itself within a reasonable time after written request of the Contractor. Contractor shall provide Owner's Representative a copy of such written request.

4.3 Review of the Work
4.3.1 The Architect and the Owner's Representative shall, at all times, have access to the Work; and the Contractor shall provide proper and safe facilities for such access.

4.3.2 The Owner’s Representative shall have authority to reject Work that does not strictly comply with the requirements of the Contract Documents. Whenever the Owner’s Representative considers it necessary or advisable for implementation of the intent of the Contract Documents, Owner's Representative shall have the authority to require additional inspection or testing of the Work, whether or not such Work is fabricated, installed or completed.

4.3.3 The fact that the Architect or the Owner's Representative observed, or failed to observe, faulty Work, or Work done which is not in accordance with the Contract Documents, regardless of whether or not the Owner has released final payment, shall not relieve the Contractor from responsibility for all damages and additional costs of the Owner as a result of defective or faulty Work.

4.4 Claims
4.4.1 A Claim is a demand or assertion by Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or any other relief with respect to the terms of the Contract. The term "Claim(s)" also includes demands and assertions of Contractor arising out of or relating to the Contract Documents, including Claims based upon breach of contract, mistake, misrepresentation, or other cause for Contract Modification or
Claims must be made by written notice. Contractor shall have the responsibility to substantiate Claims.

4.4.2 Claims by Contractor must be made promptly, and no later than within fourteen (14) days after occurrence of the event giving rise to such Claim. Claims must be made by written notice. Such notice shall include a detailed statement setting forth all reasons for the Claim and the amount of additional money and additional time claimed by Contractor. The notice of Claims shall also strictly comply with all other provisions of the Contract Documents. Contractor shall not be entitled to rely upon any grounds or basis for additional money on additional time not specifically set forth in the notice of Claim. All Claims not made in the manner provided herein shall be deemed waived and of no effect. Contractor shall furnish the Owner and Architect such timely written notice of any Claim provided for herein, including, without limitation, those in connection with alleged concealed or unknown conditions, and shall cooperate with the Owner and Architect in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim.

4.4.3 Pending final resolution of a Claim, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments that are not in dispute in accordance with the Contract Documents.

4.5 Claims for Concealed or Unknown Conditions

4.5.1 If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the Contractor shall be given to the Owner's Representative promptly before conditions are disturbed, and in no event later than three (3) days after first observance of the conditions. The Owner's Representative will promptly investigate such conditions. If such conditions differ materially, as provided for above and cause an increase or decrease in the Contractor’s cost, or time, required for performance of the Work, an equitable adjustment in the Contract sum or Contract Time, or both, shall be made, subject to the provisions and restrictions set for herein. If the Owner's Representative determines that the conditions at the site are not materially different from those indicated in the Contract Documents, and that no change in the terms of the Contract is justified, the Owner's Representative will so notify the Contractor in writing. If the Contractor disputes the finding of the Owner’s Representative that no change in the terms of the Contract terms is justified, Contractor shall proceed with the Work, taking whatever steps are necessary to overcome or correct such conditions so that Contractor can proceed in a timely manner. The Contractor may have the right to file a Claim in accordance with the Contract Documents.

4.5.2 It is expressly agreed that no adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor’s (1) prior inspections, tests, reviews and preconstruction investigations for the Project, or (2) inspections, tests, reviews and preconstruction inspections which the Contractor had the opportunity to make or should have performed in connection with the Project.

4.6 Claim for Additional Cost

4.6.1 If the Contractor makes a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. In addition to all other requirements for notice of a Claim, said notice shall detail and itemize the amount of all Claims and shall contain sufficient data to permit evaluation of same by Owner.

4.7 Claims for Additional Time

4.7.1 If the Contractor makes a Claim for an increase in the Contract Time, written notice as provided herein shall be given in addition to other requirements for notice of a Claim, Contractor shall include an estimate of the probable effect of delay upon the progress of the Work, utilizing a CPM Time Impact Schedule Analysis, (TIA) as defined in the AGC Scheduling Manual. In the case of a continuing delay, only one Claim is necessary.

.1 Time extensions will be considered for excusable delays only. That is, delays that are beyond the control and/or contractual responsibility of the contractor.

4.7.2 If weather days are the basis for a Claim for additional time, such Claim shall be documented by the Contractor by data acceptable to the Owner's Representative substantiating that weather conditions for the period of time in question, had an adverse effect on the critical path of the scheduled construction. Weather days shall be defined as days on which critical path work cannot proceed due to weather conditions (including but not limited to rain, snow, etc.), in excess of the number of days shown on the Anticipated Weather Day schedule in the Special Conditions. To be considered a weather day, at least four hours must be lost due to the weather conditions on a critical path scope item for that day. Weather days and Anticipated weather days listed in the Special Conditions shall only apply to Monday through Friday. A weather day claim cannot be made for Saturdays, Sundays, New Year’s Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day and
Christmas Day, unless that specific day was approved in writing for work by the Owner's Representative.

4.7.4 The Owner will consider and evaluate requests for time extensions due to changes or other events beyond the control of the Contractor on a monthly basis only, with the submission of the Contractor’s updated schedule, in conjunction with the monthly application for payment.

4.8 Resolution of Claims and Disputes

4.8.1 The Owner's Representative will review Claims and take one or more of the following preliminary actions within ten days of receipt of a Claim: (1) request additional supporting data from the Contractor, (2) reject the Claim in whole or in part, (3) approve the Claim, or (4) suggest a compromise.

4.8.2 If a Claim has not been resolved, the Contractor shall, within ten days after the Owner's Representative's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested, (2) modify the initial Claim, or (3) notify the Owner's Representative that the initial Claim stands.

4.8.3 If a Claim has not been resolved after consideration of the foregoing and of further information presented by the Contractor, the Contractor has the right to seek administrative review as set forth in Section 4.9. However, Owner’s Representative’s decisions on matters relating to aesthetics will be final.

4.9 Administrative Review

4.9.1 Claims not resolved pursuant to the procedures set forth in the Contract Documents except with respect to Owner's Representative’s decision on matters relating to aesthetic effect, and except for claims which have been waived by the making or acceptance of final payment, or the Contractor's acceptance of payments in full for changes in work may be submitted to administrative review as provided in this section. All requests for administrative review shall be made in writing.

4.9.2 Upon written request from the Contractor, the Owner’s Review Administrator authorized by the Campus Contracting Officer will convene a review meeting between the Contractor and Owner’s Representative’s within fifteen (15) days of receipt of such written request. The Contractor and Owner's Representative will be allowed to present written documentation with respect to the claim(s) before or during the meeting. The Contractor and Owner’s Representative will be allowed to present the testimony of any knowledgeable person regarding the claim at the review meeting. The Owner’s Review Administrator will issue a written summary of the review meeting and decision to resolve the Claim within fifteen (15) days. If the Contractor is in agreement with the decision the Contractor shall notify the Owner’s Review Administrator in writing within five (5) days, and appropriate documentation will be signed by the parties to resolve the Claim.

4.9.3 If the Contractor is not in agreement with the proposal of the Owner’s Review Administrator as to the resolution of the claim, the Contractor may file a written appeal with the UM System Contracting Officer, [in care of the Director of Facilities Planning and Development,
5.1 Award of Subcontracts

5.1.1 Pursuant to Article 9, the Contractor shall furnish the Owner and the Architect, in writing, with the name, and trade for each Subcontractor and the names of all persons or entities proposed as manufacturers of products, materials and equipment identified in the Contract Documents and where applicable, the name of the installing contractor. The Owner’s Representative will reply to the Contractor in writing if the Owner has reasonable objection to any such proposed person or entity. The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection.

5.1.2 The Contractor may request to change a subcontractor. Any such request shall be made in writing to the Owner’s Representative. The Contractor shall not change a Subcontractor, person, or entity previously disclosed if the Owner makes reasonable objection to such change.

5.1.3 The Contractor shall be responsible to the Owner for acts, defaults, and omissions of its Subcontractors of any tier.

5.2 Subcontractual Relations

5.2.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor of any tier, to the extent of the Work to be performed by the Subcontractor of any tier, to be bound to the Contractor by terms of the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its sub-subcontractors. The Contractor shall make available to each proposed Subcontractor of any tier, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor of any tier shall be bound. Subcontractors of any tier shall similarly make copies of applicable portions of such documents available to their respective proposed Subcontractors of any tier.

5.2.2 All agreements between the Contractor and a Subcontractor or supplier shall contain provisions whereby Subcontractor or supplier waives all rights against the Owner, contractor, Owner’s representative, Architect and all other additional insureds for all losses and damages caused by, arising out of, or resulting from any of the perils covered by property or builders risk insurance coverage required of the Contractor in the Contract Documents. If Contractor fails to include said provisions in all subcontracts, Contractor shall indemnify, defend and hold all the above entities harmless in the event of any legal action by Subcontractor or supplier. If insureds on any such policies require separate
waiver forms to be signed by any Subcontractors of any tier or suppliers, Contractor shall obtain the same.

5.3 Contingent Assignment of Subcontract
5.3.1 No assignment by the Contractor of any amount or any part of the Contract or of the funds to be received thereunder will be recognized unless such assignment has had the written approval of the Owner, and the surety has been given due notice of such assignment and has furnished written consent hereto. In addition to the usual recitals in assignment Contracts, the following language must be set forth: "it is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of the contract and to claims and to liens for services rendered or materials supplied for the performance of the Work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials.

ARTICLE 6
SEPARATE CONTRACTS AND COOPERATION

6.1 The Owner reserves the right to let other contracts in connection with the Work.

6.2 It shall be the duty of each Contractor to whom Work may be awarded, as well as all Subcontractors of any tier employed by them, to communicate immediately with each other in order to schedule Work, locate storage facilities, etc., in a manner that will permit all Contractors to work in harmony in order that Work may be completed in the manner and within the time specified in the Contract Documents.

6.3 No Contractor shall delay another Contractor by neglecting to perform his work at the proper time. Each Contractor shall be required to coordinate his work with other Contractors to afford others reasonable opportunity for execution of their work. Any costs caused by defective or ill-timed work, including actual damages and liquidated damages for delay, if applicable, shall be borne by the Contractor responsible therefor.

6.4 Each Contractor shall be responsible for damage to Owner's or other Contractor's property done by him or persons in his employ, through his or their fault or negligence. If any Contractor shall cause damage to any other Contractor, the Contractor causing such damage shall upon notice of any claim, settle with such Contractor.

6.5 The Contractor shall not claim from the Owner money damages or extra compensation under this Contract when delayed in initiating or completing his performance hereunder, when the delay is caused by labor disputes, acts of God, or the failure of any other Contractor to complete his performance under any Contract with the Owner, where any such cause is beyond the Owner's reasonable control.

6.6 Progress schedule of the Contractor for the Work shall be submitted to other Contractors as necessary to permit coordinating their progress schedules.

6.7 If Contractors or Subcontractors of any tier refuse to cooperate with the instructions and reasonable requests of other contractors performing work for the Owner under separate contract, in the overall coordinating of the Work, the Owner's Representative may take such appropriate action and issue such instructions as in his judgement may be required to avoid unnecessary and unwarranted delay.

ARTICLE 7
CHANGES IN THE WORK

7.1 CHANGE ORDERS
7.1.1 A change order is a written instrument prepared by the Owner and signed by the Owner and Contractor formalizing their agreement on the following:
   .1 a change in the Work
   .2 the amount of an adjustment, if any, in the Contract amount
   .3 an adjustment, if any, in the Contract time

7.1.2 The Owner may at any time, order additions, deletions, or revisions in the Work by a Change Order or a Construction Change Directive. Such Change Order or Construction Change Directive shall not invalidate the Contract and requires no notice to the surety. Upon receipt of any such document, or written authorization from the Owner’s Representative directing the Contractor to proceed pending receipt of the document, Contractor shall promptly proceed with the Work involved in accordance with the terms set forth therein.

7.1.3 Until such time as the change order is formalized and signed by both the Owner and the Contractor it shall be considered a Change Order Request.

7.1.4 The amount of adjustment in the contract price for authorized Change Orders will be agreed upon before such Change Orders becomes effective and will be determined as follows:
   .1 By a lump sum proposal from the Contractor and the Subcontractors of any tier, including overhead and profit.
   .2 By a time and material basis with or without a specified maximum. The Contractor shall submit to the Owner’s Representative itemized time and material sheets depicting labor, materials, equipment utilized in completing the Work on a daily basis for the Owner's Representative approval. If this pricing option is utilized, the
7.1.5 The Contractor shall submit all fully documented change order requests with corresponding back-up documentation within the time requested by the Owner but no later than fourteen (14) working days following 1.) the Owner’s request for change order pricing in the case of a lump sum; or 2.) the completion of unit price or time and material work.

7.1.6 The Contractor shall submit change order requests in sufficient detail to allow evaluation by the Owner. Such requests shall be fully itemized by units of labor, material and equipment and overhead and profit. Such breakdowns shall be itemized as follows:

1. Labor: The Contractor’s proposal shall include breakdowns by labor, by trade, indicating number of hours and cost per hour for each Subcontractor as applicable. Such breakdowns shall only include employees in the direct employ of Contractor or Subcontractors in the performance of the Work. Such employees shall only include laborers at the site, mechanics, craftsmen and foremen. Payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers' or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor or Subcontractors. Any item or expense outside of these categories is not allowed. The expense of performing Work after regular working hours, on Saturdays, Sundays or legal holidays shall not be included in the above, unless approved in writing and in advance by Owner.

2. Material, supplies, consumables and equipment to be incorporated into the Work at actual invoice cost to the Contractor or Subcontractors; breakdowns showing all material, installed equipment and consumables fully itemized with number of units installed and cost per unit extended. Any singular item or items in aggregate greater than one thousand dollars ($1,000) in cost shall be supported with supplier invoices at the request of the Owner’s Representative. Normal hand tools are not compensable.

3. Equipment: Breakdown for required equipment shall itemize (at a minimum) delivery / pick-up charge, hourly rate and hours used. Operator hours and rate shall not be included in the equipment breakdown. Contractor must use the most cost effective equipment available in the area and should not exceed the rates listed in the Rental Rate Blue Book for Construction Equipment (Blue Book). Contractor shall submit documentation for the Blue Book to support the rate being requested.

7.2 Construction Change Directive

7.2.1 A construction change directive is a written order prepared and signed by the Owner, issued with supporting documents prepared by the Architect (if applicable), directing a change in the Work prior to agreement on adjustment of the Contract amount or Contract time, or both. A Construction Change Directive shall be used in the absence of complete agreement between the Owner and Contractor on the terms of a change order. If the Construction Change Directive allows an adjustment of the contract amount or time, such adjustment amount shall be based on one of the following methods:

1. A lump sum agreement, properly itemized and supported by substantiating documents of sufficient detail to allow evaluation.

2. By unit prices contained in the Contractor’s original proposal and incorporated in the Construction Contract or subsequently agreed upon.

3. A method agreed to by both the Owner and the contractor with a mutually agreeable fee for overhead and profit.

4. In the absence of an agreement between the Owner and the Contractor on the method of establishing an adjustment of the contract amount, the Owner, with the assistance of the architect, shall determine the adjustment amount on the basis of expenditures by the Contractor for labor, materials, equipment and other costs consistent with other provisions of the Contract. The contractor shall keep and submit to the Owner an itemized accounting of all cost components, either expended or saved, while performing the Work covered under the Construction Change Directive.

7.2.2 Upon receipt of a Construction Change Directive, Contractor shall promptly proceed with the change in the Work involved and advise Owner of Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum, Contract Time or both.

7.2.3 A Construction Change Directive signed by Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them.
Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3 **Overhead and Profit**

7.3.1 **Overhead and Profit on Change Orders** shall be applied as follows:

1. The overhead and profit charged by the Contractor and Subcontractors shall be considered to include, but not limited to, job site office and clerical expense, normal hand tools, incidental job supervision, field supervision, payroll costs and other compensation for project manager, officers, executives, principals, general managers, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, time-keepers, and other personnel employed whether at the site or in principal or a branch office for general superintendent and administration of the Work.

2. The percentages for overhead and profit charged on Change Orders shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved but in no case shall exceed the following:

   - 15% To the Contractor or the Subcontractor of any tier for Work performed with their respective forces or materials purchased
   - 5% To the Contractor on Work performed by other than his forces
   - 5% To first tier Subcontractor on Work performed by his Subcontractor of any tier

3. The Contractor will be allowed to add 2% for the cost of bonding and insurance to their cost of work. This 2% shall be allowed on the total cost of the added work, including overhead and profit.

4. Not more than three mark-ups, not to exceed individual maximums shown above, shall be allowed regardless of the number of tier subcontractors. Overhead and profit shall be shown separately for each subcontractor of any tier and the Contractor.

5. On proposals covering both increases and decreases in the amount of the Contract, the application of overhead and profit shall be on the net change in direct cost for the Contractor or Subcontractor of any tier performing the Work.

6. The percentages for overhead and profit credit to the Owner on Change Orders that are strictly decreases in the quantity of work or materials shall be negotiated and may vary according to the nature, extent, and complexity of the Work involved, but shall not be less than the following:

   - 7.5% Credit to the Owner from the Contractor or Subcontractor of any tier for Work performed with their respective forces or materials purchased
   - 2.5% Credit to the Owner from the Contractor on Work performed by other than his forces
   - 2.5% Credit to the Owner from the first tier Subcontractor on Work performed by his Subcontractor of any tier

7.4 **Extended General Conditions**

7.4.1 The Contractor acknowledges that the percentage mark-up allowed on change orders for overhead and profit cover the Contractor’s cost of administering and executing the Work, inclusive of change orders that increase the contract time. Contractor further acknowledges that no compensation beyond the specified mark-up percentages for extended overhead shall be due or payable as a result of an increase in the Contract Time.

7.4.2 The Owner may reimburse the Contractor for extended overhead if an extension of the Contract Time is granted by the Owner, in accordance with Article 4.7.1 and the Owner determines that the extension of the Contract Time creates an inequitable condition for the Contractor. If these conditions are determined by the Owner to exist the Contractor may be reimbursed by unit prices contained in the Contractor's original bid and incorporated in the Construction Contract or by unit prices subsequently agreed upon.

7.4.3 If unit prices are subsequently agreed upon, the Contractor’s compensation shall be limited as follows:

1. For the portion of the direct payroll cost of the Contractor’s project manager expended in completing the Work and the direct payroll cost of other onsite administrative staff not included in Article 7.3.1. Direct payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers’ or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor;

2. Cost of Contractor’s temporary office, including temporary office utilities expense;

3. Cost of temporary utilities required in the performance of the work;

4. Profit not to exceed 5% of the total extended overhead direct costs;

7.4.4 All costs not falling into one of these categories and costs of the Contractors staff not employed onsite are not allowed.

7.5 **Emergency Work**

7.5.1 If, during the course of the Work, the Owner has need to engage the Contractor in emergency work, whether related to the Work or not, the Contractor shall immediately
proceed with the emergency work as directed by the Owner under the applicable provisions of the contract. In so doing, Contractor agrees that all provisions of the contract remain in full force and effect and the schedule for the Work is not impacted in any way unless explicitly agreed to in writing by the Owner.

ARTICLE 8  
TIME

8.1  Progress and Completion
8.1.1  Contractor acknowledges and agrees that time is of the essence of this Contract

8.1.2  Contract Time is the period of time set forth in the Contract for Construction required for Substantial Completion and Final Completion of the entire Work or portions of the Work as defined in the Contract Documents. Time limits stated in the Contract Documents are of the essence of the Contract. The Contract Time may only be changed by a Change Order. By executing the Contract, the Contractor confirms that the Contract Time is a sufficient period for performing the Work in its entirety.

8.1.3  The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance and bonds required by Article 11 to be furnished by the Contractor.

8.1.4  The Contractor shall proceed expeditiously and diligently with adequate forces and shall achieve Substantial Completion and Final Completion within the time specified in the Contract Documents.

8.2  Delay in Completion
8.2.1  The Contractor shall be liable for all of the Owner’s damages for delay in achieving Substantial Completion and/or Final Completion of the entire Work or portions of Work as set forth in the Contract Documents within the Contract Time unless liquidated damages are specifically provided for in the Contract Documents. If liquidated damages are specifically provided for in the Contract for Construction, Contractor shall be liable for such liquidated damages as set forth in Paragraph 8.3.

8.2.2  All time limits stated in the Contract are of the essence of the Contract. However, if the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or by the Owner's Representative, by changes ordered in the Work, by strikes, lockouts, abnormal weather conditions, jurisdictional disputes, or any other causes beyond the Contractor's reasonable control which the Owner’s Representative determines may justify delay then, upon submission of the Time Impact Schedule Analysis (TIA) called out in Section 4.7 of these General Conditions, the Contract Time may be extended for a reasonable time to the extent such delay will prevent Contractor from achieving Substantial Completion and/or Final Completion within the Contract Time and if performance of the Work is not, was not or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. It shall be a condition precedent to any adjustment of the Contract Time that Contractor provide the Owner’s Representative with written notice of the cause of delay within seven (7) days from the occurrence of the event or condition which caused the claimed delay. Written notices hereunder shall be in accordance with the applicable provisions of Section 4.7.

8.2.3  The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused, or could not have been anticipated, by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, (3) prevents Contractor from completing its Work by the Contract Time, and (4) is of a duration not less than one (1) day. Delays attributable to and within the control of a Subcontractor or supplier shall not justify an extension of the Contract Time.

8.2.4  Notwithstanding anything to the contrary in the Contract Documents, except as otherwise noted in these General Conditions, an extension in the Contract Time, to the extent permitted under this Article, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity, or (4) other similar claims due to or caused by any events beyond the control of both the Owner and Contractor. In no event shall the Contractor be entitled to any compensation or recovery of any damages or any portion of damages resulting from delays caused by or within the control of Contractor or by acts or omissions of Contractor or its Subcontractors of any tier or delays beyond the control of both Owner and Contractor. If the Contractor contends that delay, hindrance, obstruction or other adverse condition results from acts or omissions of the Owner, the Owner’s Representative or the Architect, Contractor shall promptly provide written notice to the Owner. Contractor shall only be entitled to an adjustment in the Contract Sum to the extent that such acts or omissions continue after the Contractor's written notice to the Owner of such acts or omissions. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work) regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be the basis of any Claim for an increase in the Contract Sum or Contract
Time. In the event Contractor is entitled to an adjustment in the Contract Sum for any delay, hindrance, obstruction or other adverse condition caused by the acts or omissions of the Owner, the Owner’s Representative or the Architect, Contractor shall only be entitled to its actual direct costs caused thereby and Contractor shall not be entitled to and waives any right to special, indirect, or consequential damages including loss of profits, loss of savings or revenues, loss of anticipated profits, labor inefficiencies, idle equipment, home office overhead, and similar type of damages.

8.2.5 If the Contractor submits a progress report or any construction schedule indicating, or otherwise expressing an intention to achieve completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied. Further, the Contractor acknowledges and agrees that even if Contractor intends or is able to complete the Work prior to the Contract Time, it shall assert no Claim and the Owner shall not be liable to Contractor for any failure of the Contractor, regardless of the cause of the failure, to complete the Work prior to the Contract Time.

8.3 Liquidated Damages
8.3.1 If Liquidated Damages are prescribed on the Bid Form and Special Conditions in the Contract Documents, the Owner may deduct from the Contract Sum and retain as Liquidated Damages, and not as penalty or forfeiture, the sum stipulated in the Contract Documents for each calendar day after the date specified for completion of the Work that the entire Work is not substantially complete and/or finally complete.

8.3.2 The Owner’s Representative shall establish the date of Substantial completion and the date of Final Completion of the Work which shall be conclusive and binding on the Owner and Contractor for the purpose of determining whether or not Liquidated Damages shall be assessed under terms hereof and the sum total amount due.

8.3.3 Liquidated Damages or any matter related thereto shall not relieve the Contractor or his surety of any responsibility or obligation under this Contract.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 Commencement, Prosecution, and Completion
9.1.1 The Contractor shall commence Work within five (5) days upon the date of a “Notice to Proceed” from the Owner or the date fixed in the Notice to Proceed. Contractor shall prosecute the Work with faithfulness and diligence, and the Contractor shall complete the Work within the Contract Time set forth in the Contract Documents.

9.1.2 The Owner will prepare and forward three (3) copies of the Contract and Performance Bond to the bidder to whom the contract for the Work is awarded and such bidder shall return two (2) properly executed prescribed copies of the Contract and Bond to the Owner.

9.1.3 The construction period, when specified in consecutive calendar days, shall begin when the Contractor receives notice requesting the instruments listed in below. Before the Owner will issue Notice to Proceed to permit the Contractor to begin Work, the Owner shall have received the following instruments, properly executed as described in the Contract Documents. The documents below shall have been received by the Owner within fifteen (15) days after receipt of request for documents:

1. Contract
2. Bond (See Article 11)
3. Insurance (See Article 11)
4. List of Subcontractors of any tier
5. Affirmative Action Plan (see Article 13.4)

9.1.4 In the event Contractor fails to provide Owner such documents, Contractor may not enter upon the site of the Work until such documents are provided. The date the Contractor is required to commence and complete the Work shall not be affected by the Owner denying Contractor access to the site as a result of Contractor’s failure to provide such documents and Contractor shall not be entitled to an adjustment of the Contract Time or Contract sum as a result of its failure to comply with the provisions of this Paragraph

9.1.5 Contracts executed by partnerships shall be signed by all general partners of the partnership. Contracts signed by corporations shall be signed by the President or Vice President and the Secretary or Assistant Secretary. In case the Assistant Secretary or Vice President signs, it shall be so indicated by writing the word "Asst." or "Vice" in front of the words "Secretary" and "President". The corporate seal of the corporation shall be affixed. For all other types of entities, the Contractor and the person signing the Contract on behalf of Contractor represent and warrant that the person signing the Contract has the legal authority to bind Contractor to the Contract.

9.1.6 Any successful bidder which is a corporation organized in a state other than Missouri or any bidder doing business in the State of Missouri under a fictitious name shall furnish, at no cost to the Owner, no later than the time at which the executed Contract for Construction, the Payment Bond, and the Performance Bond are returned, a properly certified copy of its current Certificate of Authority and License to do business in the State of Missouri. No contract will be executed by the Owner until such certificate is furnished by the bidder, unless there already is on file with...
the Owner a current certificate, in which event, no additional certificate will be required during the period of time for which such current certificate remains in effect.

9.1.7 Within fifteen (15) calendar days of the issuance of a Notice to Proceed, the Contractor shall submit one (1) signed copy of the following instruments. No payment will be processed until all of these instruments are received and approved by the Owner's Representative.
1. Reproducible progress and payment schedule
2. Contractor's Schedule of Values
3. List of material suppliers
4. Itemized breakdown of all labor rates for each classification. Overhead and profit shall not be included. Payroll cost shall include base rate salaries and wages plus the cost of fringe benefits required by agreement or custom and social security contributions, unemployment, payroll taxes and workers' or workmen's compensation insurance and other customary and legally required taxes paid by the Contractor or Subcontractors. Any item or expense outside of these categories is not allowed. The expense of performing Work after regular working hours, on Saturdays, Sundays or legal holidays shall not be included in the above, unless approved in writing and in advance by Owner.
5. Itemized breakdown of anticipated equipment rates (breakout operator rate). Overhead and profit shall not be included. Breakdown for required equipment shall itemize (at a minimum) delivery/pick-up charge, hourly rate and hours used. Operator hours and rate shall not be included in the equipment breakdown. Contractor must use the most cost effective equipment available in the area and should not exceed the rates listed in the Rental Rate Blue Book for Construction Equipment (Blue Book). Contractor shall submit documentation for the Blue Book to support the rate being requested.

9.1.8 The Contractor shall be paid electronically using the Owner’s web-based payment program with a direct electronic transfer from the Owner’s account into the Contractor’s account. The Contractor must submit the following information to the Owner’s Representative:
1. Bank Transit Number for the Contractor’s bank into which the electronic deposit will be made.
2. Bank Account Number for the Contractor’s account into which the electronic deposit will be made.
3. Contractor’s E-Mail address so that formal notification of the deposit by the Owner can be provided.

9.2 Contract Sum

9.2.1 The Owner shall compensate Contractor for all Work described herein and in the Contract Documents the Contract Sum set forth in the Contract for Construction, subject to additions and deletions as provided hereunder.

9.3 Schedule of Values
9.3.1 Within fifteen (15) days after receipt of the Notice to Proceed, the Contractor shall submit to the Owner’s Representative a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Owner’s Representative may require. This schedule, unless objected to by the Owner’s Representative, shall be used as a basis for reviewing the Contractor's Applications for Payment. The values set forth in such schedule may, at the Owner’s option be used in any manner as fixing a basis for additions to or deletions from the Contract Sum.

9.3.2 The progress and payment schedule of values shall show the following:
1. Enough detail as necessary to adequately evaluate the actual percent complete of any line item on a monthly basis, as determined by the Owner’s Representative.
2. Line items, when being performed by a subcontractor or material supplier, shall correlate directly back to the subcontract or purchase order amount if requested by the Owner’s Representative.

9.4 Applications for Payment
9.4.1 The Contractor shall submit monthly to the Owner’s Representative and the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be supported by such data substantiating the Contractor's right to payment as the Owner’s Representative or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage as provided for herein.

9.4.2 Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier.

9.4.3 Progress payments shall be made on account of materials and equipment delivered to the site and incorporated in the Work. No payments will be made for materials and equipment stored at the Project site but not yet incorporated into the Work except as provided in Paragraph 9.4.4.

9.4.4 If approved in writing and in advance by Owner, progress payments may be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Owner may in its sole discretion refuse to grant approval for payments for materials and equipment stored at the Project site but not yet incorporated in the Work. Any approval by Owner for payment for materials and equipment delivered and suitably stored at the Project site but not yet incorporated in the Work.
stored at the site, or stored offsite as noted below, for subsequent incorporation in the Work shall be conditioned upon Contractor’s demonstrating that such materials and equipment are adequately protected from weather, damage, vandalism and theft and that such materials and equipment have been inventoried and stored in accordance with procedures established by or approved by the Owner. Nothing in this clause shall imply or create any liability on the part of the Owner for the Contractor’s inventory and storage procedures or for any loss or damage to material, equipment or supplies stored on the site, whether incorporated into the work or not. In the event any such loss or damage occurs, the Contractor remains solely responsible for all costs associated with replacement of the affected materials, supplies and equipment including labor and incidental costs, and shall have no claim against the Owner for such loss.

No allowance shall be made in the project pay requests for materials not delivered to the site of the work and incorporated into the work, except as noted below. For the purposes of this Article, Offsite is defined as any location not owned or leased by the Owner. Contractor shall submit a list of materials that they are requesting payment for offsite storage within 60 days of Notice Proceed.

.1 Items considered to be major items of considerable magnitude, if suitably stored, may be allowed in project pay requests on the basis of ninety percent (90%) of invoices

.2 Determination of acceptable “major items of considerable magnitude” and “suitably stored” shall be made by the Owner’s Representative.

.3 Aggregate quantities of materials not considered unique to this project will not be considered for offsite storage payment.

.4 Contractor shall submit to the Owner’s Representative a list of the material for which application for payment for offsite storage is anticipated no less than forty-five days prior to the submission of the applicable pay request. The list shall include a material description, applicable division, quantity and discounts offered to the Owner for early payment. Contractor shall also submit the location the material will be stored and the method of protection.

.5 The storage facility shall be subject to approval by the Owner’s representative, shall be located within an acceptable distance of the project sites as established by the Owner’s Representative and all materials for the Owner’s project must be stored separately from all other items within the storage facility and shall be labeled and stored in the name of the Curators of the University of Missouri.

.6 The Owner’s representative shall be provided a minimum of two weeks notice to visit the storage facility and inspect the stored material prior to submission of the pay request.

.7 Upon favorable inspection by the Owner’s Representative, the Contractor shall, at the Owner’s option, submit the appropriate UCC filing, transferring title of the material or equipment to The Curators of the University of Missouri.

.8 An invoice provided by the supplier shall be included with the applicable pay request.

.9 The contractor shall remain fully responsible for all items, until acceptance of the project by the Owner.

10. The contractor shall reimburse all costs incurred by the Owner in inspecting and verifying all material stored offsite, including mileage, airfare, meals, lodging and time, charged at a reasonable hourly rate.

9.4.5 The Application for Payment shall constitute a representation by the Contractor to the Owner that the Work has progressed to the point indicated; the quality of the Work covered by the Application for Payment is in accordance with the Contract Documents; and the Contractor is entitled to payment in the amount requested.

9.4.6 The Contractor will be reimbursed for ninety-five percent (95%) of the value of all labor furnished and material installed and computed in the same manner, less all previous payments made. On projects where a bond is not required, the contractor will be reimbursed for ninety percent (90%) of the value of all labor furnished and material installed and computed in the same manner, less all previous payments made.

9.5 Approval for Payment

9.5.1 The Owner’s Representative will, within fifteen (15) days after receipt of the Contractor's Application for Payment, either approve Contractor’s Application for Payment for such amount as the Owner’s Representative determines is properly due, or notify the Contractor of the Owner’s Representative's reasons for withholding certification in whole or in part as provided in Section 9.6.

9.6 Decisions to Withhold Approval

9.6.1 The Owner’s Representative may decide not to certify payment and may withhold approval in whole or in part, to the extent reasonably necessary to protect the Owner. If the Owner’s Representative is unable to approve payment in the amount of the Application, the Owner’s Representative will notify the Contractor as provided in Paragraph 9.5.1. If the Contractor and Owner’s Representative cannot agree on a revised amount, the Owner’s Representative will promptly issue approval for payment for the amount for which the Owner’s Representative is able to determine is due Contractor. The Owner’s Representative may also decide not to approve payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of approval for payment previously issued, to such extent as may
be necessary in the Owner’s Representative opinion to protect the Owner from loss because of:

.1 defective Work not remedied or damage to completed Work;
.2 failure to supply sufficient skilled workers or suitable materials;
.3 third party claims filed or reasonable evidence indicating probable filing of such claims;
.4 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment, Owner may, at its sole option issue joint checks to subcontractors who have presented evidence that it has not been paid in accordance with the Contract;
.5 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.6 damage to the Owner or another contractor;
.7 reasonable evidence that the Work will not be completed within the Contract Time or an unsatisfactory rate of progress made by Contractor;
.8 Contractor's failure to comply with applicable Laws;
.9 Contractor’s or Subcontractor’s failure to comply with contract Prevailing Wage requirements; or
.10 Contractor’s failure to carry out the Work in strict accordance with the Contract Documents.

9.6.2 When the above reasons for withholding approval are removed, approval will be made for amounts previously withheld.

9.7 Progress Payments

9.7.1 Based upon Applications for Payment submitted to the Owner by the Contractor and approvals issued by the Owner’s Representative, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

9.7.2 The period covered by each Application for Payment shall be one (1) calendar month.

9.7.3 The Owner shall make payment to Contractor for amounts due and approved by Owner’s Representative not later than thirty (30) days after the Owner approves a properly detailed Application for Payment which is in compliance with the Contract Documents. The Owner shall not have the obligation to process or pay such Application for Payment until it receives an Application for Payment satisfying such requirements.

9.7.4 Based on the Schedule of Values submitted by Contractor, Applications for Payment submitted by Contractor shall indicate the actual percentage of completion of each portion of Contractor's Work as of the end of the period covered by the Application for Payment.

9.7.5 The Contractor shall promptly pay each Subcontractor and Supplier, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's or supplier's portion of the Work, the amount to which said Subcontractor or supplier is entitled, reflecting percentages actually retained from payments to the Contractor on account of each Subcontractor's or supplier's portion of the Work, in full compliance with state statute. The Contractor shall, by appropriate agreement with each Subcontractor or supplier, require each Subcontractor or supplier to make payments to Sub-subcontractors in similar manner.

9.7.6 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor of any tier nor a laborer or employee of Contractor except to the extent required by law. Retainage provided for by the Contract Documents are to be retained and held for the sole protection of Owner, and no other person, firm or corporation shall have any claim or right whatsoever thereto.

9.7.7 An approval for payment by Owner’s Representative, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.8 Failure of Payment

9.8.1 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment by Contractor shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that to which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that to which the Owner is entitled.

9.9 Substantial Completion

9.9.1 Substantial Completion is the stage in the progress of the Work as defined in Paragraph 1.1.9 as certified by the Owner.

9.9.2 When the Contractor considers the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Owner and the Architect. The Owner’s Representative will make an inspection to determine whether the Work or designated
portion thereof is substantially complete. If the Owner’s Representative's inspection discloses any item which is not in accordance with the requirements of the Contract Documents, the Contractor shall complete or correct such item upon notification by the Owner’s Representative. The Contractor shall then submit a request for another inspection by the Owner’s Representative to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Owner will issue a Certificate of Substantial Completion. Substantial Completion shall transfer from the Contractor to the Owner responsibilities for security, maintenance, heat, utilities, damage to the Work and insurance. In no event shall Contractor have more than thirty (30) days to complete all items on the Punch List and achieve Final Completion. Warranties required by the Contract Documents shall commence on the date of Substantial Completion or as agreed otherwise.

9.9.3 At the date of Substantial Completion, the Contractor may apply for, and if approved by Owner’s Representative, the Owner, subject to the provisions herein, shall increase total payments to one hundred percent (100%) of the Contract Sum less one hundred fifty percent (150%) of the value of any incomplete Work and unsettled claims, as determined by the Owner’s Representative.

9.10 Partial Occupancy or Use
9.10.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, security, maintenance, heat, utilities, damage to the Work and insurance. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by the Owner’s Representative.

9.10.2 Immediately before such partial occupancy or use, the Owner, and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 Final Completion and Final Payment
9.11.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner’s Representative and the Architect will promptly make such inspection and, when the Owner’s Representative and Architect find the Work acceptable under the Contract Documents and the Contract fully performed, the Owner’s Representative will promptly issue a final approval for payment; otherwise, Owner’s Representative will return Contractor’s Final Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. Submission of a Final Application for Payment shall constitute a further representation that conditions listed in Paragraph 9.11.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner’s Representative as part of the final Application for Payment. The final approval for payment will not be issued by the Owner’s Representative until all warranties and guarantees have been received and accepted by the Owner.

9.11.2 The Owner will request the Contractor to submit the application for final payment along with a manually signed notarized letter on the Contractor's letterhead certifying that:
.1 Labor costs, prevailing wage rates, fringe benefits and material costs have been paid.
.2 Subcontractors of any tier and manufacturers furnishing materials and labor for the project have fully completed their Work and have been paid in full.
.3 The project has been fully completed in accordance with the Contract Documents as modified by Change Orders.
.4 The acceptance by Contractor of its Final Payment, by check or electronic transfer, shall be and operate as a release of all claims of Contractor against Owner for all things done or furnished or relating to the Work and for every act or alleged neglect of Owner arising out of the Work.

9.11.3 Final Payment constituting the entire unpaid balance due shall be paid by the Owner to the Contractor within thirty (30) days after Owner's receipt of Contractor's Final Application for Payment which satisfies all the requirements of the Contract Documents and Owner’s receipt of all information and documents set forth in Section 9.11.

9.11.4 No payment under this Contract, including but not limited to final payment, shall constitute acceptance by Owner of any Work or act not in accordance with the requirements of the Contract Documents.

9.11.5 No recourse shall be had against any member of the Board of Curators, or officer thereof, for any payment under the Contract or any claim based thereon.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY
10.1 Safety Precautions and Programs

10.1.1 The Contractor shall at all times conduct operations under this Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. The Contractor shall promptly take precautions which are necessary and adequate against conditions created during the progress of the Contractor's activities hereunder which involve a risk of bodily harm to persons or a risk of damage to property. The Contractor shall continuously inspect Work, materials, and equipment to discover and determine any such conditions and shall be solely responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with applicable safety laws, standards, codes, and regulations in the jurisdiction where the Work is being performed, specifically, but without limiting the generality of the foregoing, with rules regulations, and standards adopted pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and applicable amendments.

10.1.2 All contractors, subcontractors and workers on this project are subject to the Construction Safety Training provisions 292.675 RSMo.

10.1.3 In the event the Contractor encounters on the site, material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), lead, mercury, or other material known to be hazardous, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner's Representative and the Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner's Representative and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB), or when it has been rendered harmless by written agreement of the Owner's Representative and the Contractor. “Rendered Harmless” shall mean that levels of such materials are less than any applicable exposure standards, including but limited to OSHA regulations.

10.2 Safety Of Persons And Property

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide protection to prevent damage, injury, or loss to:

1. students, faculty, staff, the public, construction personnel, and other persons who may be affected thereby;
2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor or the Contractor's Subcontractors of any tier; and
3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including, but not limited to, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise the highest degree of care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Article 10 caused in whole or in part by the Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, and for which the Contractor is responsible under Article 10, except damage or loss attributable solely to acts or omissions of Owner or the Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's other obligations stated elsewhere in the Contract.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents, and the maintaining, enforcing and supervising of safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner's Representative and Architect. The Contractor shall hold regularly scheduled safety meetings to instruct Contractor personnel on safety practices, accident avoidance and prevention, and the Project Safety Program. The Contractor shall furnish safety equipment, and enforce the use of such equipment by it's employees and it's subcontractors of any tier.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
10.2.8 The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work which cause death, lost time injury, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner.

10.2.9 The Contractor shall promptly notify in writing to the Owner of any claims for injury or damage to personal property related to the work, either by or against the Contractor.

**ARTICLE 11**

**INSURANCE & BONDS**

11.1 Insurance

11.1.1 Contractor shall secure from the date of the Contract for Construction and maintain for such periods of time as set forth below, insurance of such types and in such amounts specified below, to protect Contractor, Owner and others against all hazards or risks of loss described below. The form of such insurance together with carriers thereof, in each case, shall be approved by Owner, but, regardless of such approval, it shall be the responsibility of Contractor to maintain the insurance coverages set forth herein.

11.1.2 The contractor shall not be allowed on the Owners property without proof of the insurance coverages set forth herein.

11.2 Commercial General Liability

11.2.1 Contractor shall secure and maintain from the date of the Contract and for a period of at least five (5) years from the date of Final Completion of the entire Work Commercial General Liability insurance ("CGL") with a combined single limit of not less than $2,000,000 per occurrence, $5,000,000 general aggregate, $5,000,000 products and completed operations aggregate and $1,000,000 personal injury and advertising injury. General Aggregate should apply per project. An umbrella policy may be used to satisfy these limits. If the General Aggregate is not on a per project basis, the contractor shall provide an additional $2,000,000 general aggregate.

11.2.2 CGL insurance shall be written on a comprehensive form and shall cover claims and liability in connection with or resulting from the Contractor’s operations and activities under the Contract, for personal injuries, occupational sickness, disease, death or damage to property of others, including loss of use resulting therefrom, arising out of any operations or activities of the Contractor, its agents, or any Subcontractors of any tier or by anyone directly or indirectly employed by either of them.

11.2.3 CGL insurance shall include premises, operations, independent contractors, products-completed operations, personal injury and advertising injury and liability assumed under an insured contract (including the tort liability of another assumed in a business contract) coverages. In particular, and not by way of any limitation, the CGL insurance shall cover the Contractor’s indemnity obligations contained in the Contract Documents.

11.2.4 There shall be no endorsement or modification of the CGL policy limiting the scope of coverage for liability arising from blasting, explosion, collapse, or underground property damage.

11.2.5 “The Curators of the University of Missouri” shall be endorsed as an “additional insured” under the CGL policy. The additional insured status must be conveyed by using the ISO CG 2 10 (2004) edition or equivalent and the ISO CG 20 37 (2004) edition. The policy shall be endorsed to be primary coverage and any other insurance carried by the Owner shall be excess only and will not contribute with Contractors’ insurance. To confirm, the Endorsement should accompany the insurance certificate.

11.2.6 Contractor waives all rights against Owner and its agents, officers, representatives and employees for recovery of damages to the extent those damages are covered by the CGL policy required hereunder.

11.3 Licensed for Use Vehicle Liability

11.3.1 Contractor shall secure and maintain from the date of the Contract for Construction until the date of Final Completion of the entire Work, insurance, to be on comprehensive form, which shall protect Contractor against any and all claims for all injuries and all damage to property arising from the use of automobiles, trucks and motorized vehicles, in connection with the performance of Work under this Contract, and shall cover the operation on or off the site of the Work of all motor vehicles licensed for highway use whether they are owned, non-owned or hired. Such insurance shall include contractual liability coverage and shall provide coverage on the basis of the date of any accident. The liability limits under such policy shall not be less than $2,000,000 combined single limit for bodily injury and property damage per accident.

11.3.2 Contractor waives all rights against Owner and its agents, officers, directors and employees for recovery of damages to the extent such damages are covered by the automobile liability insurance required hereunder.

11.4 Workers’ Compensation Insurance

11.4.1 Contractor shall purchase and maintain workers’ compensation insurance and employers’ liability insurance...
which shall protect Contractor from claims for injury, sickness, disease or death of Contractor’s employees or statutory employees. The insurance policies required hereunder shall include an “all states” or “other states” endorsement. In case any Work is sublet, Contractor shall require any Subcontractor of any tier to provide the insurance coverages required under this Section 11.4.

11.4.2 Contractor’s workers’ compensation insurance coverage shall be in compliance with all applicable Laws, including the statutes of the State of Missouri. Contractor’s employers’ liability coverage limits shall not be less than $1,000,000 each accident for bodily injury by accident or $1,000,000 each employee for bodily injury by disease.

11.5 Liability Insurance General Requirements
11.5.1 All insurance coverages procured by Contractor shall be provided by agencies and insurance companies acceptable to and approved by Owner. Any insurance coverage shall be provided by insurance companies that are duly licensed to conduct business in the State of Missouri as an admitted carrier. The form and content of all insurance coverage provided by Contractor are subject to the approval of Owner. All required insurance coverages shall be obtained and paid for by Contractor. Any approval of the form, content or insurance company by Owner shall not relieve the Contractor from the obligation to provide the coverages required herein.

11.5.2 All insurance coverage procured by the Contractor shall be provided by insurance companies having policyholder ratings no lower than "A-" and financial ratings not lower than "XI" in the Best's Insurance Guide, latest edition in effect as of the date of the Contract, and subsequently in effect at the time of renewal of any policies required by the Contract Documents. Insurance coverages required hereunder shall not be subject to a deductible amount on a per-claim basis of more than $10,000.00 and shall not be subject to a per-occurrence deductible of more than $25,000.00. Insurance procured by Contractor covering the additional insureds shall be primary insurance and any insurance maintained by Owner shall be excess insurance.

11.5.3 All insurance required hereunder shall provide that the insurer’s cost of providing the insureds a defense and appeal, including attorneys’ fees, shall be supplementary and shall not be included as part of the policy limits but shall remain the insurer’s separate responsibility. Contractor shall cause its insurance carriers to waive all rights of subrogation, except for Workers’ Compensation, against the Owner and its officers, employees and agents.

11.5.4 The Contractor shall furnish the Owner with certificates, Additional Insured endorsements, policies, or binders which indicate the Contractor and/or the Owner and other Contractors (where required) are covered by the required insurance showing type, amount, class of operations covered, effective dates and dates of expiration of policies prior to commencement of the work. Contractor is required to maintain coverages as stated and required to notify the University of a Carrier Change or cancellation within 2 business days. The University reserves the right to request a copy of the policy. Contractor fails to provide, procure and deliver acceptable policies of insurance or satisfactory certificates or other evidence thereof, the Owner may obtain such insurance at the cost and expense of the Contractor without notice to the Contractor.

11.5.5 With respect to all insurance coverages required to remain in force and affect after final payment, Contractor shall provide Owner additional certificates, policies and binders evidencing continuation of such insurance coverages along with Contractor’s application for final payment and shall provide certificates, policies and binders thereafter as requested by Owner.

11.5.6 The maintenance in full current force and effect of such forms and amounts of insurance and bonds required by the Contract Documents shall be a condition precedent to Contractor’s exercise or enforcement of any rights under the Contract Documents.

11.5.7 Failure of Owner to demand certificates, policies and binders evidencing insurance coverages required by the Contract Documents, approval by Owner of such certificates, policies and binders or failure of Owner to identify a deficiency from evidence that is provided by Contractor shall not be construed as a waiver of Contractor’s obligations to maintain the insurance required by the Contract Documents.

11.5.8 The Owner shall have the right to terminate the Contract if Contractor fails to maintain the insurance required by the Contract Documents.

11.5.9 If Contractor fails to maintain the insurance required by the Contract Document, Owner shall have the right, but not the obligation, to purchase said insurance at Contractor’s expense. If Owner is damaged by Contractor’s failure to maintain the insurance required by the Contract Documents, Contractor shall bear all reasonable costs properly attributable to such failure.

11.5.10 By requiring the insurance set forth herein and in the Contract Documents, Owner does not represent or warrant that coverage and limits will necessarily be adequate to protect Contractor, and such coverages and limits shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner in the Contract Documents.
11.5.11 If Contractor’s liability policies do not contain a standard separation of insureds provision, such policies shall be endorsed to provide cross-liability coverage.

11.5.12 If a part of the Work hereunder is to be subcontracted, the Contractor shall: (1) cover any and all Subcontractors in its insurance policies; (2) require each Subcontractor to secure insurance which will protect said Subcontractor and supplier against all applicable hazards or risks of loss designated in accordance with Article 11 hereunder; and (3) require each Subcontractor or supplier to assist in every manner possible in the reporting and investigation of any accident, and upon request, to cooperate with any insurance carrier in the handling of any claim by securing and giving evidence and obtaining the attendance of witnesses as required by any claim or suit.

11.5.13 It is understood and agreed that the insurance coverages required by the provisions of this Article 11 are required in the public interest and that the Owner does not assume any liability for acts of Contractor or Subcontractors of any tier or their employees in the performance of the Contract or Work.

11.6 Builder’s Risk Insurance

11.6.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the State of Missouri, as an admitted carrier, builder’s risk insurance on the entire Work. Such insurance shall be written on a completed value form for the entire Work. The insurance shall apply on a replacement cost basis.

11.6.2 The insurance as required herein shall name as insureds the Owner, Contractor and all Subcontractors of any tier. The insurance policy shall contain a provision that the insurance will not be canceled, allowed to expire or materially changed until at least thirty (30) days prior written notice has been given to Owner.

11.6.3 The insurance as required herein shall cover the entire Work, including reasonable compensation for Architect’s services and expenses made necessary by an insured loss. Insured property shall include portions of the Work located away from the site (including all offsite stored materials) but intended for use at the site, and shall also cover portions of the Work in transit, including ocean transit. The policy shall include as insured property scaffolding, falsework, and temporary buildings located at the site. The policy shall cover the cost of removing debris, including demolition as may be made legally necessary by the operation of any law, ordinance or regulation.

11.6.4 The insurance required herein shall be on an all risk form and shall be written to cover all risks of physical loss or damage to the insured party and shall insure at least against the perils of fire and extended coverage, theft, vandalism, malicious mischief, collapse, lightning, earthquake, flood, frost, water damage, windstorm and freezing.

11.6.5 If there are any deductibles applicable to the insurance required herein, Contractor shall pay any part of any loss not covered because of the operation of such deductibles.

11.6.6 The insurance as required herein shall be maintained in effect until the earliest of the following dates:

.1 the date which all persons and organization who are insureds under the policy agree in writing that it shall be terminated;

.2 the date on which final payment of this Contract has been made by Owner to Contractor; or

.3 the date on which the insurable interests in the property of all insureds other than the Owner have ceased.

11.6.7 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors of any tier, suppliers, agents and employees, each of the other, (2) the Architect and Architect's consultants, and (3) separate contractors described in Article 6, if any, and any of their subcontractors of any tier, suppliers, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 11.7 or other insurance applicable to the Work, except such rights as they have to proceed of such insurance. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors of any tier, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, was at fault or was negligent in causing the loss and whether or not the person or entity had an interest in the property damaged.

11.6.8 A loss insured under Contractor’s property insurance shall be adjusted by the Owner in good faith and made payable to the Owner for the insureds, subject to requirements of the Contract Documents. The Contractor shall pay Subcontractors of any tier their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors of any tier to make payments to their Sub-subcontractors in similar manner.

11.7 Bonds
11.7.1 When the Contract sum exceeds Fifty Thousand Dollars ($50,000), the Contractor shall procure and furnish a Performance Bond and a Payment Bond in the form prepared by the Owner, each in an amount equal to one hundred percent (100%) of the Contract Sum, as well as adjustments to the Contract Sum. The Performance Bond shall secure and guarantee Contractor’s faithful performance of this Contract, including but not limited to Contractor’s obligation to correct defects after final payment has been made as required by the Contract Documents. The Payment Bond shall secure and guarantee payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. These Bonds shall be in effect through the duration of the Contract plus the Guaranty Period as required by the Contract Documents.

11.7.2 The bonds required hereunder shall be executed by a responsible surety licensed in the State of Missouri, with a Best’s rating of no less than A-IX. The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of this power of attorney indicating the monetary limit of such power.

11.7.3 If the surety of any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to conduct business in the State of Missouri is terminated, or it ceases to meet the requirements of this paragraph, Contractor shall within ten (10) days substitute another bond and surety, both of which must be acceptable to Owner. If Contractor fails to make such substitution, Owner may procure such required bonds on behalf of Contractor at Contractor’s expense.

11.7.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds to such person or entity.

11.7.5 The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety’s consent to or waiver of: (1) notice of changes in the Work; (2) request for reduction or release of retention; (3) request for final payment; and (4) any other material required by the surety. The Owner shall be notified by the Contractor, in writing, of all communications with the surety, as it relates to items one through four. The Owner may, in the Owner's sole discretion, inform surety of the progress of the Work, any defects in the Work, or any defaults of Contractor under the Contract Documents and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Work.

11.7.6 Contractor shall indemnify and hold harmless the Owner and any agents, employees, representative or member of the Board of Curators from and against any claims, expenses, losses, costs, including reasonable attorneys’ fees, as a result of any failure of Contractor to procure the bonds required herein.

ARTICLE 12
UNCOVERING AND CORRECTION OF THE WORK

12.1 Uncovering of the Work
12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it shall, if required in writing by the Architect or the Owner's Representative, be uncovered for the Architect's observation and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Architect or the Owner's Representative has not specifically requested to observe, prior to its being covered, the Architect or the Owner's Representative may request to see such Work, and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner will be responsible for payment of such costs.

12.2 Correction of the Work
12.2.1 The Architect or Owner’s Representative shall have the right to reject Work not in strict compliance with the requirements of the Contract Documents. The Contractor shall promptly correct Work rejected by the Architect or the Owner's Representative for failing to conform to the requirements of the Contract Documents, whether observed before or after final completion and whether or not fabricated, installed, or completed. If Work has been rejected by Architect or Owner's Representative, the Architect or Owner's Representative shall have the right to require the Contractor to remove it from the Project site and replace it with Work that strictly conforms to the requirements of the Contract Documents regardless if such removal and replacement results in “economic waste.” Contractor shall pay all claims, costs, losses and damages caused by or resulting from the correction, removal or replacement of defective Work, including but not limited to, all costs of repair or replacement of Work of others. The Contractor shall bear costs of correcting, removing and replacing such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby. If prior to the date of final payment, the Contractor, a Subcontractor or anyone for whom either is responsible uses or damages any portion of
the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to “like new” condition at no expense to the Owner.

12.2.2 If, within twelve (12) months after the date of Final Completion of the Work or designated portion thereof, or after the date for commencement of warranties, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found not to be in strict accordance with the requirements of the Contract Documents, the Contractor shall correct or remove and replace such defective Work, at the Owner’s discretion. Such twelve (12) month period is referred to as the “Guarantee Period.” The obligations under this Paragraph 12.2.2 shall cover any repairs, removal and replacement to any part of the Work or other property caused by the defective Work.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct or remove it and replace such nonconforming Work. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Owner, the Owner may take action to correct or remove the nonconforming work at the contractor’s expense.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged Work or property, whether completed or partially completed, of the Owner or of others caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.6 Nothing contained in Article 12 shall be construed to establish a period of limitation with respect to other obligations that the Contractor might have under the Contract Documents. Establishment of the twelve (12) month Guarantee Period as described in Article 12 relates only to the specific obligation of the Contractor to correct, remove or replace the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations under the Contract Documents. The requirements of Article 12 are in addition to and not in limitation of any of the other requirements of the Contract for warranties or conformance of the Work to the requirements of the Contract Documents.

12.3 Acceptance of Nonconforming Work
12.3.1 The Owner may accept Work which is not in accordance with the Contract Documents, instead of requiring its removal and correction, in its sole discretion. In such case the Contract Sum will be adjusted as appropriate and equitable. Such adjustment shall be made whether or not final payment has been made. Nothing contained herein shall impose any obligation upon the Owner to accept nonconforming or defective Work.

ARTICLE 13
MISCELLANEOUS PROVISIONS

13.1 Written Notice
13.1.1 All notices required to be given by the contractor under the terms of this Contract shall be made in writing. Written notice when served by the Owner will be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an office of the corporation for which it was intended, or if delivered at or sent to the last business address known to the party giving notice.

13.2 Rights and Remedies
13.2.1 Duties and obligations imposed by the Contract Documents, and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.2.2 No action or failure to act by the Owner, the Architect, or the Owner's Representative will constitute a waiver of a right or duty afforded to the Owner under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.2.3 The terms of this Contract and all representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Work and shall remain in effect so long as the Owner is entitled to protection of its rights under applicable law.

13.2.4 Contractor shall carry out the Work and adhere to the current construction schedule during all disputes or disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements except as the Owner and Contractor may otherwise agree to in writing.
13.3 Tests and Inspections

13.3.1 Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules or regulations shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, and shall bear related costs of tests, inspections, and approvals. The Contractor shall give the Architect and the Owner's Representative timely notice of when and where tests and inspections are to be made so the Architect and/or the Owner's Representative may observe procedures.

13.3.2 If the Architect or the Owner's Representative determine that portions of the Work require additional testing, inspection or approval not included in the Contract Documents, or required by law, the Architect, or the Owner's Representative will instruct the Contractor to make arrangements for such additional testing, inspection, or approval by an entity acceptable to the Owner's Representative and the Contractor shall give timely notice to the Architect, and the Owner's Representative, of when and where tests and inspections are to be made so the Architect and/or the Owner's Representative may observe such procedures. The Owner will bear such costs except as provided elsewhere in Article 13.

13.3.3 If such procedures for testing, inspection, or approval under Article 13 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses.

13.3.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner’s Representative and Architect.

13.3.5 Contractor shall take all necessary actions to ensure that all tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.3.6 Contractor shall arrange for and pay for all costs of all testing required by the Contract Documents or any applicable Laws for materials to be tested or certified at or on the place or premises of the source of the material to be supplied. The Owner shall have the right to require testing of all materials at the place of the source of the material to be supplied if not required by the Contract Documents or any applicable Laws. The Owner shall bear the costs of such tests and inspections not required by the Contract Documents of or by applicable Laws unless prior defective Work provides Architect or Owner with a reasonable belief that additional defective Work may be found, in which case Contractor shall be responsible for all costs of tests and inspections ordered by the Owner or Architect, whether or not such tests or inspection reveals that Work is in compliance with the Contract Documents.

13.4 Nondiscrimination in Employment Equal Opportunity

13.4.1 The University serves from time to time as a contractor for the United States government. Accordingly, the provider of goods and/or services shall comply with federal laws, rules and regulations applicable to subcontractors of government contracts including those relating to equal employment opportunity and affirmative action in the employment of minorities (Executive Order 11246), women (Executive Order 11375), persons with disabilities (29 USC 706) and Executive Order 11758, and certain veterans (38 USC 4212 formerly [2012]) contracting with business concerns with small disadvantaged business concerns (Publication L. 95-507). Contract clauses required by the Government in such circumstances are incorporated herein by reference.

13.5 Supplier Diversity Goal Program

13.5.1 The Contractor shall subcontract with diverse firms no less than the amount pledged in the Contractor’s Bid and/or the amount accepted by the Owner.

13.5.2 If the Contractor must remove any diverse subcontractor of any tier, the Contractor shall replace the diverse subcontractor of any tier with another diverse subcontractor(s) of equal dollar value to the diverse supplier removed. The Contractor shall immediately notify the Owner’s Representative in writing of the Contractor’s intent to remove any, and the Contractor’s plan to maintain subcontracts with diverse firms of no less than amount pledged in the Contractor’s Bid and/or the amount accepted by the Owner. All changes of diverse subcontractor of any tier shall be approved by the Director of Facilities Planning & Development.

13.5.3 If the Contractor fails to meet or maintain the contractor’s Supplier Diversity subcontracting pledge, the Contractor shall immediately notify in writing the Owner’s Representative, and the Director of Facilities Planning & Development. Such notice shall include a description of the Contractor’s good faith effort to comply with their Supplier Diversity subcontracting pledge.

13.5.4 If the Director of Facilities Planning & Development finds the Contractor has failed to comply in good faith with the Owner’s Supplier Diversity goal program, the Director may take appropriate action, including but not limited to, declaring the Contractor ineligible to participate in any contracts with the Owner for a period not to exceed six (6) months, and/or directing that the Contractor's actions be
declared a material breach of the Contract and that the Contract be terminated.

13.5.5 The Contractor and his subcontractors shall develop, implement, maintain, and submit in writing to the Director of Facilities Planning & Development, an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed "Affidavit for Affirmative Action" in the form as included in the Contract Documents. For the purpose of this section, an "Affirmative Action Program" means positive actions to influence all employment practices (including, but not limited to, recruiting, hiring, promoting, and training) in providing equal employment opportunity regardless of race, color, sex, national origin, religion, age (where the person affected is between 40 and 70), disabled and Vietnam-era veteran status, and handicapped otherwise qualified status. Such affirmative action program shall include:

.1 A written policy statement committing the total organization to affirmative action and assigning management responsibilities and procedures for evaluation and dissemination.

.2 The identification of a person designated to handle affirmative action.

.3 The establishment of non-discriminatory selection standards, objective measures to analyze recruitment, an upward mobility system, a wage and salary structure, and standards applicable to lay-off, recall, discharge, demotion, and discipline.

.4 The exclusion of discrimination from collective bargaining agreements.

.5 Performance of an internal audit of the reporting system to monitor execution and to provide for future planning.

13.5.6 In the enforcement of this non-discrimination requirement, the Owner may use any reasonable procedures available, including but not limited to: requests, reports, site visits, and inspection of relevant documents of Contractors and Subcontractors of any tier. The contractor shall submit a final Affidavit of Supplier Diversity Participation for each diverse firm at the end of the project stating the actual amount paid to the diverse firm.

13.6 Wage Rates (If the contract amount is less than $75,000, the requirements of this section will not apply. Any contract adjustments that increase the contract above $75,000 will be subject to this section.)

13.6.1 The Contractor shall pay workers employed in the execution of this contract in full each week and not less than the predetermined wage rates and overtime for work of a similar character that have been made a part of this Contract. These rates are determined by the University of Missouri Director of Facilities Planning and Development. The rates are based on wage rates published in the Annual Wage Orders of the Missouri Department of Labor and Industrial Relations (MDLIR). The Contractor is to use MDLIR 8 CSR 30-3.020; .030; .040, .060 in determining the appropriate occupational titles and rates for workers used in the execution of this contract. All determinations and/or interpretations regarding wage rates and classification of workers will be made by the office of the University of Missouri Director of Facilities Planning and Development. The Contractor is responsible for the payment of the aggregate of the Basic Hourly Rate and the Total Fringe Benefits to the workers on the project. Fringe benefit payments may be made to the worker in cash, or irrevocably made by a Contractor or Subcontractor to a trustee or to a third person pursuant to a fund, plan or program, or pursuant to an enforceable commitment, or any combination thereof, to carry out a financially responsible plan or program which was communicated in writing to the workmen affected, for medical or hospital care, pensions on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the Contractor or Subcontractor is not required by other federal or state law to provide any of the benefits as referenced in §290.210(5) RSMo 1994. Pay for travel, mileage, meals, bonuses, or other expenses are not fringe benefits and cannot be considered part of the workers wage rate. The Contractor shall not make any deductions for food, sleeping accommodations, transportation, use of small tools, uniforms, or anything of any kind or description, unless the Contractor and employee enter into an agreement in writing at the beginning of the worker’s term of employment, and such agreement is approved by the Owner. In the event the contract contains more than one wage determination the Contractor shall comply with both.

13.6.2 The Contractor shall submit to the Owner with the Contractor’s periodic pay request, certified payroll records for labor performed by the Contractor and Subcontractors of any tier. The Contractor shall submit all required certified payroll information records electronically in pdf format using the Owner’s web-based payment program. The certified payroll forms shall contain the name, address, personal identification number, and occupational title of the workers as well as the hours they work each day. The Owner’s acceptance of certified payroll records does not in any way relieve the Contractor of any responsibility for the payment of prevailing wages to workers on the project. The Contractor shall also maintain copies of the certified payroll

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provisions of Article 13.6 would be difficult to expense. The cost of Contractor's violation of the delays, of additional work for Owner's staff and legal Owner, including, but not limited to, cost of construction requirements of Article 13.6 result in additional costs to been completed. The liquidated damages and other shall be collected regardless of whether the Work has completed. The liquidated damages and other

13.6.3 The acquisition of products or services is subject to the supplier's conformance to the rules and regulations of the President's Committee on Equal Employment Opportunity (41 CFR, Ch. 60).

13.6.4 The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3), which are incorporated herein by reference. In addition, the Weekly Statement of Compliance required by these Regulations shall also contain a statement that the applicable fringe benefits paid are equal to or greater than those set forth in the minimum wage decision.

13.6.5 Contractor acknowledges that violation of the requirements of Article 13.6 result in additional costs to Owner, including, but not limited to, cost of construction delays, of additional work for Owner’s staff and legal expense. The cost of Contractor’s violation of the provisions of Article 13.6 would be and is difficult to determine and establish. In the event that Contractor fails to comply with the provisions of this Article 13.6, Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the sum of Fifty Dollars ($50.00) per day per individual who is paid less than the applicable prevailing wage, to approximate the investigative cost resulting to the Owner for such violations. To approximate the delay costs, Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the sum of One Hundred Dollars ($100.00) per day for each day the Contract cannot be closed out and final payment made because of Contractor’s failure to comply with the provisions of this Article 13.6. Such liquidated damages shall be collected regardless of whether the Work has been completed. The liquidated damages and other amounts set forth in this Article 13.6 shall be in addition to all other liquidated damages the Owner may be entitled as set forth in the Contract Documents.

13.6.6 The Owner may deduct liquidated damages described Article 13 and the amounts set forth in Article 13 from any unpaid amounts then or thereafter due the Contractor under the Contract. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner.

13.6.7 The Contractor shall specifically incorporate the obligations of Article 13 into the subcontracts, supply agreements and purchase orders for the Work and require the same of any Subcontractors of any tier.

13.6.8 Contractor acknowledges and recognizes that a material factor in its selection by the Owner is the Contractor’s willingness to undertake and comply with the requirements of this Article 13.6. If Contractor fails to comply with the provisions of this Article 13.6, Owner may, in its sole discretion, immediately terminate the Contract upon written notice. The rights and remedies of Owner provided herein shall not be exclusive and are in addition to other rights and remedies provided by law or under this Contract.

13.6.9 Only such workers who are individually registered in a bona fide apprenticeship program approved by the U.S. Department of Labor, Office of Apprenticeship can be paid less than the journeyperson rate of pay. “Entry Level Workers; must be registered apprentices. The apprenticeship ratio will be one to one with a journeyperson of the same classification. Any worker not registered as an apprentice per this section will be paid as a journeyperson.

13.6.10 The Contractor shall post the wage rates for the contract in a conspicuous place at the field office on the project. On projects where there is no field office the Contractor may post the wage rates at their local office, as long as they provide a copy of the wage rates to a worker upon request. The wage rates shall be kept in a clearly legible condition for the duration of the project.

13.6.11 Neither the Contractor, nor any Subcontractor of any tier, nor any person hired by them or acting on their behalf, shall request or demand that workers pay back, return, donate, contribute or give any part, or all, of said workers wages, salary, or any thing of value, upon the statement, representation or understanding that failure to comply with such request or demand will prevent such worker from procuring or retaining employment. The exception being to an agent or representative of a duly constituted labor organization acting in the collection of dues or assessments of such organization.
13.6.12 No contractor or subcontractor may directly or indirectly receive a wage subsidy, bid supplement, or rebate for employment on this project if such wage subsidy, bid supplement, or rebate has the effect of reducing the wage rate paid by the employer on a given occupational title below the prevailing wage rate as provided in contract. In the event a wage subsidy, bid supplement, or rebate is provided or received, the entity receiving such subsidy, supplement, or rebate shall report the date and amount of such subsidy, supplement, or rebate to the University within thirty days of receipt of payment. This disclosure report shall be a matter of public record. Any employer not in compliance with this Article shall owe to the University double the dollar amount per hour that the wage subsidy, bid supplement, or rebate has reduced the wage rate paid by the employer below the prevailing wage rate for each hour that work was performed.

13.6.13 Time and one half overtime will be paid on all hours over 10 hours per day or 40 hours per week. The wage rate is the total of the “Basic Hourly Rate” plus “Total Fringe Benefits” or the “public works contracting minimum wage”. For all work performed on a Sunday or Holiday, not less than twice the prevailing hourly rate of pay or public works contracting minimum wage will apply. Holidays are as follows: January first, the last Monday in May, July fourth, the first Monday in September, November 11, the fourth Thursday in November, December twenty-fifth. If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

13.7 Records

13.7.1 The Owner, or any parties it deems necessary, shall have access to and the right to examine any accounting or other records of the Contractor involving transactions and Work related to this Contract for five (5) years after final payment or five (5) years after the final resolution of any on going disputes at the time of final payment. All records shall be maintained in accordance with generally accepted accounting procedures, consistently applied. Subcontractors of any tier shall be required by Contractor to maintain records and to permit audits as required of Contractor herein.

13.8 Codes and Standards

13.8.1 The Work shall be performed to comply with the International Code Council (ICC) Codes, and the codes and standards noted below. The latest editions and supplements of these Codes and Standards in effect on the date of the execution of the Contract for Construction shall be applicable unless otherwise designated in the Contract Documents. Codes and standards required by accreditation agencies will also be used unless the ICC requirements are more stringent. In the event that special design features and/or construction systems are not covered in the ICC codes, the applicable edition of the National Fire Protection Association (NFPA) family of standards and/or the NFPA 101 Life Safety Code shall be used.

.1 ICC International Building Code and reference standards
.2 ICC International Plumbing Code
.3 ICC International Mechanical Code
.4 NFPA 70 National Electric Code (NEC)
.5 Americans with Disabilities Act – Standards for Accessible Design.
.6 American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks as published by the American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI) A17.1
.7 NFPA 101 Life Safety Code (as noted above)
.8 American Concrete Institute (ACI)
.9 American National Standards Institute (ANSI)
.10 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
.11 American Refrigeration Institute (ARI)
.12 American Society for Testing and Materials (ASTM)
.13 Missouri Standard Specification for Highway Construction, Missouri State Highway Commission
.14 National Electrical Manufacturers Association (NEMA)
.15 Underwriter's Laboratories, Inc. (UL), Federal Specifications
.16 Williams Steiger Occupational Safety and Health Act of 1970 (OSHA)

13.9 General Provisions

13.9.1 Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and are also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

13.9.2 This Contract shall be interpreted, construed, enforced and regulated under and by the laws of the State of Missouri. Whenever possible, each provision of this Contract shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Contract, or a portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without invalidating or affecting the remaining provisions of this Contract or valid portions of such provision, which are hereby deemed severable. Contractor and Owner further agree that in the event any provision of this Contract, or a portion thereof, is prohibited by law or found
invalid under any law, this Contract shall be reformed to replace such prohibited or invalid provision or portion thereof with a valid and enforceable provision which comes as close as possible to expressing the intention of the prohibited or invalid provision.

13.9.3 Contractor and Owner each agree that the State of Missouri Circuit Court for the County where the Project is located shall have exclusive jurisdiction to resolve all Claims and any issue and disputes between Contractor and Owner. Contractor agrees that it shall not file any petition, complaint, lawsuit or legal proceeding against Owner in any other court other than the State of Missouri Circuit Court for the County where the Project is located.

13.9.4 Owner’s total liability to Contractor and anyone claiming by, through, or under Contractor for any Claim, cost, loss, expense or damage caused in part by the fault of Owner and in part by the fault of Contractor or any other entity or individual shall not exceed the percentage share that Owner’s fault bears to the total fault of Owner, Contractor and all other entities and individuals as determined on the basis of comparative fault principles.

13.9.5 Contractor agrees that Owner shall not be liable to Contractor for any special, indirect, incidental, or consequential damage whatsoever, whether caused by Owner’s negligence, fault, errors or omissions, strict liability, breach of contract, breach of warranty or other cause or causes whatsoever. Such special, indirect, incidental or consequential damages include, but are not limited to loss of profits, loss of savings or revenue, loss of anticipated profits, labor inefficiencies, idle equipment, home office overhead, and similar types of damages.

13.9.6 Nothing contained in this Contract or the Contract Documents shall create any contractual relationship with or cause of action in favor of a third party against the Owner.

13.9.7 No member or officer of the Board of Curators of the University incurs or assumes any individual or personal liability under the Contract or by reason of the default of the Owner in the performance of any terms thereof. Contractor releases and discharges all members or officers of the Board of Curators of the University from any liability as a condition of and as consideration for the award of the Contract to Contractor.

13.9.8 The Contractor hereby binds itself, its partners, successors, assigns and legal representatives to the Owner in respect to covenants, agreements and obligations contained in the Contract Documents. Contractor shall not assign the Contract or proceed hereof without written consent of the Owner. If Contractor attempts to make such an assignment without such consent, it shall be void and confer no rights on third parties, and Contractor shall nevertheless remain legally responsible for all obligations under the Contract. The Owner’s consent to any assignment is conditioned upon Contractor entering into a written assignment which contains the following language: “it is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor and to claims and liens for services rendered or materials supplied for the performance of the Work required in said Contract in favor of all persons, firms, corporations rendering such services or supplying such materials.”

13.10 Debarment and Suspension Certification
The contractor certifies to the best of its knowledge and belief that it and its principals are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency in accordance with Executive Order 12549 (2/18/86).

ARTICLE 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 Termination by Owner for Cause
14.1.1 In addition to other rights and remedies granted to Owner under the Contract Documents and by law, the Owner may terminate the Contract if the Contractor:
.1 refuses or fails to supply enough properly skilled workers, superintendents, foremen, or managers;
.2 refuses or fails to supply sufficient or proper materials;
.3 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
.4 disregards laws, ordinances, rules, or regulations or orders of a public authority having jurisdiction;
.5 disregards the authority of the Owner’s Representative or Architect;
.6 breaches any warranty or representations made by the Contractor under or pursuant to the Contract Documents;
.7 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;
.8 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents;
.9 fails to maintain a satisfactory rate of progress with the Work or fails to comply with approved progress schedules; or
.10 violates in any substantial way any provisions of the Contract Documents.

14.1.2 When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner,
terminate this Contract by delivering a written notice of termination to Contractor and Contractor’s surety, and may:

.1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
.2 accept assignment of subcontracts pursuant to Paragraph 5.3; and
.3 finish the Work by whatever reasonable method the Owner may deem expedient, including turning the Work over to the surety.

14.1.3 The Contractor, in the event of a termination under Section 14.1, shall not be entitled to receive any further payments under the Contract until the Work is completed in its entirety. Then, if the unpaid balance under the Contract shall exceed all expenses of the Owner in finishing the Work, including additional compensation for the Architects services and expenses made necessary thereby, such excess will be paid to the Contractor; but, if such expenses of Owner to finish the Work shall exceed the unpaid balance, the Contractor and its surety shall be liable for, and shall pay the difference and any damages to the Owner. The obligation of the Contractor and its surety for payment of said amounts shall survive termination of the Contract.

14.1.4 In exercising the Owner's right to secure completion of the Work under any of the provisions hereof, the Owner shall have the right to exercise the Owner's sole discretion as to the manner, methods, and reasonableness of costs of completing the Work.

14.1.5 The rights of the Owner to terminate pursuant to Article 14.1 will be cumulative and not exclusive and shall be in addition to any other remedy provided by law or the Contract Documents.

14.1.6 Should the Contractor fail to achieve Final Completion of the Work within thirty (30) calendar days following the date of Substantial Completion, the Owner may exercise its rights under Article 14.1.

14.2 Suspension by the Owner for Convenience

14.2.1 The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.2.2 An adjustment will be made to the Contract Sum for increases in the cost of performance of the Contract caused by suspension, delay or interruption. However, in the event of a suspension under this Article 14.2, Contractor hereby waives and forfeits any claims for payment of any special, indirect, incidental or consequential damages such as lost profits, loss of savings or revenue, loss of anticipated profits, idle labor or equipment, home office overhead, and similar type damages. No adjustment will be made to the extent:

.1 that performance is, was, or would have been so suspended, delayed or interrupted by another cause for which the Contractor in whole or in part is responsible, or
.2 that an equitable adjustment is made or denied under another provision of this Contract.

14.3 Owner’s Termination for Convenience

14.3.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Paragraph shall be by a notice of termination delivered to the Contractor specifying the extent of termination and the effective date.

14.3.2 Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

.1 cease operation as specified in the notice;
.2 place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete Work not terminated;
.3 terminate all subcontracts and orders to the extent they relate to the Work terminated;
.4 proceed to complete the performance of Work not terminated; and
.5 take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated Work.

14.3.3 Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions and for all Owner approved claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors and suppliers. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits, consequential damages and other economic losses.

14.3.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

14.3.5 Upon determination by a court that termination of Contractor or its successor in interest pursuant to Paragraph 14.1 was wrongful, such termination will be deemed converted
to a termination for convenience pursuant to Paragraph 14.3, and Contractor's sole and exclusive remedy for wrongful termination is limited to recovery of the payments permitted for termination for convenience as set forth in Paragraph 14.3.
SECTION 1.E
SPECIAL CONDITIONS

1. DEFINITIONS

h. "Drawings"

Drawings referred to in and accompanying Project Manual consist of Drawings prepared by and bearing name of below defined Engineer and Architect, bearing January 29, 2020 bearing name “MUHC BAS UPGRADES” and project number of CP171064.

a. Mechanical Engineer

Ross & Baruzzini, Inc.
6 South Old Orchard
St. Louis, Missouri 63119
Phone: 314-918-8383
Contact: Sean King, P.E.
Email: sean.king@rossbar.com

b. Electrical Engineer

Ross & Baruzzini, Inc.
6 South Old Orchard
St. Louis, Missouri 63119
Phone: 314-918-8383
Contact: Karl F. Miller, P.E.
Email: kmiller@rossbar.com

c. Architect

bcDesign Group, Inc.
100 E Park Street, Suite 202
Olathe, KS 66061
Phone: 913-232-2123
Contact: Kurt Broeckelmann, AIA
Email: kurtb@bc-dg.com


2. SPECIAL SCHEDULING REQUIREMENTS

a. Special scheduling requirements supplemental to the bid form.

(1) Except where indicated otherwise, all work shall be performed after hours or on weekends.
(2) After hours are defined as 6 p.m. to 5 a.m..
(3) Weekends are defined as 6 p.m. Friday to 5 a.m. Monday.
(4) Contractor’s schedule to be coordinated and approved by Owner’s representative.
(5) Areas identified as restricted access require coordination with Owner’s representative.
(6) Any work performed outside the hours defined above must be coordinated and approved by Owner’s Representative with 48 hours advanced notice.
All areas of the project scope require construction activities to be coordinated and scheduled with Owner’s Representative.

All work performed under this contract is to be completed in an operational facility. It is the contractor’s responsibility to maintain coordination with Owner and to remain flexible in scheduling of tasks. A two week look-ahead schedule is to be maintained throughout the duration of the project.

All building HVAC systems must be fully functional at completion of each work shift.

Contractor is to allow time twice weekly for afternoon project coordination meetings with Owner’s Representative. These meetings will occur during normal business hours at a time determined by Owner’s Representative.

3. SCOPE OF WORK

a. The Contractor shall furnish all labor, materials, tools, equipment necessary for, and incidental to, construction of this project as indicated on Drawings and specified herein.

b. Work shall include everything requisite and necessary to finish work properly, notwithstanding that every item of labor or materials or accessories required to make project complete may not be specifically mentioned.

c. General Description of Work: The project includes replacing the existing pneumatic controls with DDC controls for select VAV boxes associated with AHU-9, install pressure monitors with DDC interface to air handling units with final filter sections in various locations, and replace the Operating Room positive pressure monitors in the MOI with positive pressure monitors with DDC interface.

(1) Project consists of replacing the existing pneumatic controls with DDC controls for the existing VAV box controllers and valves. VAV box actuator, heating hot water control valves, and thermostats are included.

(2) Demolition shall consist of removal of existing pneumatic controllers, valves, actuators, thermostats, and wall mounted positive pressure monitors.

(3) Mechanical work shall consist of replacing existing pneumatic controls with DDC controls, installing final filter pressure monitors, and replacing existing wall mounted positive pressure monitors as described above.

(4) Electrical work shall consist of providing power to the new DDC power supplies.

(5) Contractor shall provide commissioning of new control system.

a. Owner will provide contractor with a workstation connected to the BAS controls network for purposes of manipulating and functional testing.

4. LOCATION

Work shall be performed under this Contract on campus of the University of Missouri - Columbia, at University Physician’s Medical Building.

5. NUMBER OF CONSTRUCTION DOCUMENTS

a. The Owner's Representative will furnish the Contractor a copy of executed Contract and a complete set of Drawings and Specifications in pdf format.
b. The Owner will furnish explanatory and changed Drawings in pdf format to Contractor as issued during project.

c. Hard copy prints of any documents (bid or explanatory) will be printed at the Contractor’s expense through a printer of their choosing.

6. SUBMITTALS

a. The Contractor shall submit for approval to the Engineer, equipment lists and Shop Drawings, as expeditiously as possible. Failure of the Contractor to submit Shop Drawings in a timely manner will result in the Owner holding back Contractor payments. (See General Conditions)

b. The material and equipment lists shall be submitted and approved before any material or equipment is purchased and shall be corrected to as-built conditions before the completion of the project.

c. The Contractor shall submit electronic versions of all required Shop Drawings, material and equipment lists. The Contractor shall upload all Shop Drawings to a secure information sharing website determined by the Owner notifying the Owner and Consultant that these shop drawings are available for review. Refer to: http://www.cf.missouri.edu/pdc/sharepoint_guides.html for protocols for the use of this website. Each submittal shall have the General Contractors digital stamp affixed to the first page signifying their review and acceptance. Review comments, approvals, and rejections will be posted on this same site with notification to the contractor. Submittals requiring a professional seal shall be submitted hard copy with a manual seal affixed.

(1) The Contractor shall identify each submittal item with the following:

   (a) Project Title and Location
   (b) Project Number
   (c) Supplier’s Name
   (d) Manufacturer’s Name
   (e) Contract Specification Section and Article Number
   (f) Contract Drawing Number
   (g) Acrobat file name: Spec Section Times Submitted-Spec Title: 033000_01-Cast In Place Concrete.pdf

(2) Reference the accompanying Shop Drawing and Submittal Log at the end of this section (1.E.3) for required submittal information.

d. The Contractor shall submit to the Engineer one (1) bound copy and one pdf copy of all required Operating Instructions and Service Manuals for the Engineer’s and the Owner’s sole use prior to completing 50% of the adjusted contract. Payments beyond 50% of the contract amount may be withheld until all Operating Instructions and Service Manuals are received as referenced in the accompanying Operating Instructions and Service Manual Log at the end of this section (1.E.4).

e. The Contractor shall submit to the Owner’s Representative all items referenced in the accompanying Closeout Log (1.E.5) within 30 days following substantial completion of the work. The Owner’s Representative will maintain the closeout log and include as an agenda item at all coordination meetings.

7. NOTIFICATION
Before beginning Demolition Work or service outages, the Contractor shall provide, at minimum, fourteen (14) days advance notice to Owner’s Representative for purpose of verifying utility locations including, but not limited to, gas, telecommunications, electric, water, steam, sewer, and nitrogen. Contractor shall minimize the number of outages, minimize the length of outages and related work shall be continuous until the utility is restored.

8. USE OF PREMISES

a. Access: Access to construction site shall be as directed by the Owner's Representative.

b. Parking:

(1) No parking permits will be issued for this project.

(2) Parking of personal vehicles within project access/lay down/staging areas is prohibited. Violation of this requirement may result in ticketing and/or towing at the vehicle owner’s expense and suspension of progress payments.

(3) Parking or driving on sidewalks, landscaped areas, within fire and service lanes or generally in areas not designated for vehicular traffic is prohibited except as allowed in the contract documents. Violation of this requirement may result in ticketing and/or towing at the vehicle owner’s expense and suspension of progress payments.

(4) Free parking for contractor employees is available in the Ashland Road Contractor lot on an as available basis. This space is for use by contractor employees for parking their personal vehicles only and is not to be used for staging or storage.

(5) Vendor Permits may be purchased by contractor management personnel on an as available basis by contacting the MU Parking and Transportation office. These permits will allow contractor management personnel to park in various University lots while conducting business on University construction projects.

(6) Temporary University parking permits may be purchased by contractor employees for use with their personal vehicles on an as available basis by contacting the MU Parking and Transportation office.

(7) Conley Avenue between Missouri Avenue and University Avenue and Hitt Street between University Avenue and the Memorial Union are designated for pedestrian use only during the work week between the hours of 8:15 AM and 3:45 PM. Unless otherwise indicated in the contract documents, this area is strictly off limits to vehicular traffic without authorization from the Owner’s Representative.

(8) Parking at University Hospital: Limited contractor parking is available near the corner at Virginia Avenue and Hospital Drive as directed by Owner’s
Representative.

c. Storage of materials: The Contractor shall store all materials within project limits. The Contractor shall confine apparatus, materials, and operation of workers to location established by the Owner's Representative. The Contractor shall not unreasonably encumber premises with materials. In addition, storage trailer locations may be available within 1-1/2 miles of project site as directed by the Owner’s Representative. Storage trailer locations shall be subject to approval by the Owner's Representative and are available to the Contractor without cost.

d. Utilities: Drinking water, water required to carry on work, and 120-volt electrical power required for small tool operation may be obtained without cost to the Contractor from existing utilities at locations designated by the Owner's Representative. Provisions for obtaining power, including temporary extensions, shall be furnished and maintained by the Contractor. Upon completion of work such extensions shall be removed and any damage caused by use of such extensions shall be repaired to satisfaction of the Owner's Representative, at no cost to the Owner.

e. Restroom: Existing toilet facilities within Project Limits or Restrooms designated by the Owner's Representative for use by the Contractor will be available. Failure of the Contractor to maintain restrooms in a clean condition will be cause for the Contractor's discontinued use of the restroom.

f. The use of tobacco products is prohibited at the University of Missouri and all properties owned, operated, leased or controlled by the University of Missouri. Violation of the policy is defined as the use of any tobacco products, including e-cigarettes.

g. Landfill: The Contractor shall not use the Owner’s landfill. Dumping or disposal of excavated or demolition materials on Owner’s property shall not be permitted. The Contractor shall remove and legally dispose of excavated or demolished materials off the Owner’s property.

h. Care of Project Work Site: The contractor shall be responsible for maintaining the construction site in a reasonably neat and orderly condition by regular cleaning and mowing of the premises as determined by the Owner’s Representative.

i. Discharge to Sewer Request: The University of Missouri’s MS4 permit and NPDES Storm Water Discharge Permits along with the City of Columbia’s POTW Operating Permit as well as local ordinances, and state and federal environmental regulations prohibit hazardous materials from being disposed into either the storm water or sanitary sewer systems. Unless specifically approved, all chemical products such as paints, dyes, lawn care products, maintenance products, and oil & grease are prohibited from drain disposal. Any product, including contaminated water, being discarded into the storm water or sanitary sewer systems requires written approval from the Owner through a formal “Discharge to Sewer Request” form obtained at Discharge to Sewer Request Form. The contractor should submit the form to the Owner’s Representative, not to the Department of Environmental Health and Safety as the form indicates.

j. All concrete waste material including washout water shall be totally contained and removed from the Owner’s property.

k. Artifacts Found During Construction: Contractor shall immediately notify the Owner’s Representative when artifacts are uncovered or found during the demolition or construction
process. Artifacts include, but are not limited to, tools, drawings (construction or other), photographs, books and other objects/devices which may hold historical importance/significance. Do not remove or disturb the object(s) in question. Artifacts are not considered part of demolished materials and shall remain the property of the University of Missouri.

9. PROTECTION OF OWNER'S PROPERTY

a. The Contractor shall be responsible for repair of damage to building exterior and interior, drives, curbs, streets, walks, grass, shrubbery and trees, which was caused by workmen or equipment employed during progress of work. All such repairs shall be made to satisfaction of the Owner's Representative, at no cost to the Owner, or reimburse the Owner if the Owner elects to make repairs. For landscape damage, the Owner shall make such repairs. Compensation for these repairs shall be determined by the Owner's Representative using the "Valuation of Landscape Trees, Shrubs, and other Plants" as published by the International Society of Arboriculture, as last revised.

b. Construction Project Fencing:

(1) Fencing will not be required as a part of work.

c. Preserving and Protecting Existing Vegetation:

(1) To prevent compaction of soil over tree roots, vehicles or equipment shall not at any time park or travel over, nor shall any materials be stored within drip line of trees designated to remain.

(2) Owner's Representative will stop work immediately when proper measures are not being employed to protect trees and shrubs. Contractor will be notified to resume work after required protection measures are implemented.

10. SUBSTITUTIONS and EQUALS

a. Substitutions are defined in General Conditions article 3.11.8 for and Equals are defined General Conditions Article 3.12.

b. Use of materials, products or equipment other than those named and described in the Contract Documents are substitutions and/or equal. Substitutions and/or equals submitted during the bidding period shall be received by both the Architect and the Owner at least ten calendar days prior to the date for receipt of bids. To be considered, bidder’s proposal shall include a complete description of the proposed substitution and/or equal and a comparison of significant qualities of the proposed substitution and/or equal with those specified including drawings, performance and test data, and other information necessary for an evaluation. The Architect's decision on the approval or disapproval of a proposed substitution and/or equal shall be final.

c. If the Architect and Owner approve a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approval made in any other manner.

11. CODES AND STANDARDS

The Contractor shall comply with applicable codes and standards as listed in General Conditions. The following codes and standards shall also apply:
a. Not applicable.

12. PERMITS

a. The Contractor shall comply with applicable codes and standards as listed in the Contract Documents, General Conditions, and the Healthcare Construction Guidelines.
b. All permits, including, but not limited to Infection Control, Hot Work, Fire Alarm, Energized Work and HVAC interruption shall be coordinated and scheduled with the Owner’s Representative and or his designee prior to commencement of the work.
c. Permits for Boilers, Water Heaters and Pressure Vessels require an installation permit from the State of Missouri. Contractors must obtain this permit. Applications are available via the State of Missouri website.

13. SPECIALTIES

a. The Owner has elected to pre-purchase the following equipment:

(1) Johnson VMA controllers
(2) Johnson FEC/IOM controllers
(3) Johnson thermostats
(4) Johnson Network Engine

b. A complete Bill of Materials will be available to the bidders upon request for reference.

c. The Contractor shall be responsible for coordinating the delivery, receiving and installing the equipment as if he had made the purchase. If there is a problem with the equipment regarding compliance with the order of the submittals, start-up, or warranty, then the Contractor shall act for the Owner and arrange for the necessary corrections, replacement parts, back charges, technical support, etc. The installed equipment shall carry the warranty specified herein as specified in the other portions of the specifications. It shall be the responsibility of the Contractor during the warranty period to respond to the evident malfunction or failure of the equipment as though he had directly purchased the equipment. This includes conducting the necessary diagnostic efforts and, if the malfunction is deemed by the Contractor to be an equipment liability issue, to so resolve the problem with the supplier as the Owner’s agent.

14. PRE-BID INSPECTION

All pre-bid inspections of work areas shall be scheduled with pre-bid inspection guide.

15. ROOF WARRANTY REQUIREMENT

(SECTION NOT USED)

16. MODIFICATIONS TO INFORMATION TO BIDDERS

(SECTION NOT USED)

17. MODIFICATION TO INFORMATION FOR BIDDERS: BIDDERS STATEMENT OF QUALIFICATIONS
18. MODIFICATIONS TO GENERAL CONDITIONS

(SECTION NOT USED)

19. PROJECT SCHEDULING

The project scheduling specification for the project are included immediately after the Special Conditions. For this project the Contractor shall meet the following scheduling requirements.

Contractor Schedule – Contractor is responsible for the schedule and must comply with the Owner’s requirements. See Contractor Schedule Specification included in these documents.

20. PROJECT COORDINATION

a. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

   (1) Schedule construction operations in the 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 assure maximum accessibility for required maintenance, service, and repair.

   (3) Make provisions to accommodate items scheduled for later installation.

   (4) The Contractor shall furnish and properly install all sleeves, slots, chases, openings, recesses, supports, anchors and anchor bolts required for his Work in coordination with the other trades.

21. PROJECT PARTNERING

(SECTION NOT USED)

22. VALUE ENGINEERING

(SECTION NOT USED)

23. BUILDING SYSTEM COMMISSIONING

a. Contractor shall provide all personnel and equipment required to complete the commissioning activities referenced in the Commissioning Plan. The requirements of the commissioning plan shall be completed in their entirety before substantial completion and submitted as referenced in the Closeout Log.

b. The contractor shall designate a competent person, separate from the superintendent or Project Manager, to act as the contractor’s commissioning coordinator. The commissioning coordinator is responsible for planning, scheduling, coordinating,
conducting and verifying all commissioning activities required by the commissioning plan and ensuring all building systems are complete, operable and ready for use by the Owner. At a minimum, building ventilation systems, chilled/hot water generation systems, hydronic distribution systems, power distributions systems and fire detection and alarm systems, as applicable.

c. Each terminal unit variety shall be mocked up and reviewed by the construction project manager and Owner for approval before proceeding with the installation of the terminal unit controls.

d. The contractor is to conduct a point to point checkout for all equipment and shall document the effort.

e. Checkout forms shall be submitted by the contractor for approval.

f. Checkout forms shall be completed and submitted by the contractor.

24. MECHANICAL, ELECTRICAL, PLUMBING (MEP) PRE-INSTALLATION MEETING(S)

a. Before the start of MEP installation, the Owner’s Representative will convene an MEP pre-installation meeting. Meeting participants to include contractor (including MEP subcontractors), Owner’s Representative and additional contractor and University operational staff invited by the Owner’s Representative. Topics will include underground rough-ins, steam piping, chilled water piping, sprinkler piping, hot water piping, electrical system, duct, telephone/data wiring, control wiring. Additional meetings will be conducted as required for the review of coordination drawings and scope specific installations. Cross section drawings of corridor ceilings and other congested areas will be of highest priority and will be reviewed prior to the start of installations in the affected areas. Meeting minutes and sign-up sheet will be transcribed by contractor and distributed to attendees.

25. COST BREAKOUT FOR OWNER’S ACCOUNTING PURPOSES

(SECTION NOT USED)

26. PROJECT MANAGEMENT/COMMUNICATION REQUIREMENTS

a. The Contractor shall be represented at the site by both a competent full-time superintendent with no other assigned duties or responsibilities from the beginning of the work until its final acceptance, unless otherwise permitted by the Owner’s Representative. The superintendent for the Contractor for the general building work shall exercise general supervision over all subcontractors of any tier engaged on the work with decision-making authority of the Contractor.

b. The Contractor shall use a current industry standard (Primavera, Microsoft Project, etc.) project scheduling software which provides as a minimum: Critical paths, milestones, estimated and actual start and completion dates, scheduled vs. actual progress, and detailed task and subtask breakdown. The following schedules shall be provided as a minimum and kept current: Overall project schedule, four- (4-) week look-ahead, and two- (2-) week look-ahead.

c. The Contractor shall furnish on-site Internet access for use by his Project Manager and superintendent. The University is providing an on-line, secure project communications web site which will be used as a major method of communicating and storing project
information. This web site will be used to communicate directed and group email, RFIs, change order requests and authorizations, and general correspondence. It will serve as a project message board, file storage and retrieval system, and will provide access to and storage of digital photos and contract documents and revisions.

d. The Contractor shall provide at least two (2) job site FM handheld communication radios (walkie-talkies) for use by the on-site superintendent and the Owner’s Representative or the Contractor shall provide his on-site superintendent with a handheld cellular telephone.

27. SAFETY PRECAUTIONS AND PROGRAMS

a. The Bidder’s Statement of Qualifications includes a requirement that the Bidder provide its Worker’s Compensation Experience Modification Rates (EMR) and Incidence Rates for the three recent years. The Bidder shall also include the EMR and Incidence Rates of listed major subcontractors on the Bid for Lump Sum Contract. If the EMR exceeds 1 or the Incidence Rate exceeds 13, the Contractor or major subcontractor shall take additional safety measures including, but not limited to, developing a site-specific safety plan and assigning a Safety Manager to the Project to perform inspections on a schedule as determined acceptable by the Owner with written reports to be submitted to the Owner. The Owner reserves the right to reject a Bidder or major subcontractor whose rates exceed these stated rates.

b. The contractor shall provide Emergency Contact Information for the Contractor’s on-site staff and home office management as well as contact information for all major subcontractor personnel. This information shall contain business and personal phone numbers for each individual for contact during or after hours in case of an emergency. This information shall be submitted within 15 days of the Notice to Proceed.

28. CONSTRUCTION WASTE MANAGEMENT

(SECTION NOT USED)

29. WARRANTY WALKTHROUGH

Contractor shall attend a walk-thru with the Owner at 11 months after acceptance to review and document any warranty items to be addressed as part of the 12 month warranty stated in article 3.1 of the General Conditions.

END OF SECTION
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SECTION 1  TRAINING REQUIREMENTS

The purpose of the training requirements for contractors is to ensure that construction project work in and around the healthcare environment is managed in such a way to minimize health and safety risks associated with construction activities and that contractors know and understand their responsibilities.

Required Training
1. Contractor project managers, superintendents and subcontractor foremen will be required to attend the following training:
   - Minimum of One (1) hour training related to “Infection Control & Dust Barriers” and “Healthcare Construction Training for Contractors”.
2. Contractor project managers, superintendents and subcontractor foremen have the responsibility for ensuring that contractor employees are knowledgeable of the training requirements and direct their employees and project work accordingly.
3. Contractors will be required to utilize the MU Hospital online eMeditrack system for initiating work requests of various types, examples may include infection control barriers, utility outage, various permits required.
4. Contractors are required to report in and sign in and out at the designated location per building location each work day upon arrival and exit of the work location.

Training Agenda
At a minimum the topics to be covered in the training include the following:
2. Contractor Training Requirements.

Documentation
1. All employees who receive training will be required to sign their name on a training acknowledgement form stating that they have been oriented to the training requirements.
2. Healthcare Safety and Infection Control Requirements will be in the project contract documents for further review as required.
3. COMPLIANCE VIOLATIONS: Contractors/Vendors who violate the requirements of this Guideline are subject to disciplinary action and removal from the project.

SECTION 2  EMERGENCY PHONE NUMBERS & CONTACT INFORMATION

Telephone contacts should be used by the contractor for emergency situations which may arise during the construction project. Contact Plan will be identified and coordinated at the project Pre-Construction Meeting by the owner’s representative.

SECTION 3  CONTRACTOR IDENTIFICATION BADGE

Contractors working in and around the MUHC facilities will be required to display and wear the “Contractor Identification Badge” and in accordance with the information displayed below. It is the responsibility of the contractor to provide the computer and color printer for reproduction of badges required. Consult the Owner’s Representative for the electronic file.

Contractor ID Badge
1. Contractor is to issue badges to employees as required. (Contractor to validate employee with proof of ID).
2. Contractor to edit the information, print in color, cut out the badges, fold in the center and insert. Contractor will provide badge holders.
3. Contractor shall keep a roster/log of badged employees by trade/subcontractor at the project jobsite for reference by the Owners Representative.
4. All badges to be collected and returned to PD&C at the end of the project.
5. Any orientation required will be discussed at the pre-construction meeting with the Owner’s Representative.
6. Contractor employees are to wear the badge on the upper chest facing forward unless approved otherwise for safety reasons.
7. All contractor superintendent and foreman shall attend “Healthcare Construction Training” and affix issued “T” sticker in the circle area on badge as shown. This will show evidence that the employee has completed training.
8. The Badge document will be provided to the Contractor to make copies and distribute as required. See Page HCG 12.

**SECTION 4 GENERAL SAFETY REQUIREMENTS FOR HEALTH CARE PROJECTS**

The General Contractor and its Subcontractors are responsible for understanding, planning and implementing the following requirements in the management of the project.

1. Make sure shoes/boots and clothing are free of excessive dirt/debris before entering and leaving the construction area.
2. If you leave any dust/dirt or tracks in the occupied area of the healthcare facility, you must stop and clean them up immediately by using a HEPA filtered vacuum and/or a clean dampened floor mop with a UMTH hospital approved furnished cleaning solution.
3. Assure that all construction material, supplies and tools are cleaned and covered with a clean covering material while transporting through the healthcare facility.
4. Ensure that the carts and wheels on tool and supply carts as well as trash/demolition waste carts are properly wiped clean before leaving the construction area. Cleaning/wiping solutions are provided by the hospital and must be approved per direction of the Owner’s Representative.
5. Staff and patients ALWAYS have priority and the “Right of Way” in the elevators and corridors.
6. Never use aerosol sprays or cleaning solvents that could dispense fumes, odors or cause potentially allergenic reactions or medical problems to susceptible patients, staff or visitors.

**SECTION 5 CONSTRUCTION-RENOVATION-MAINTENANCE RISK ASSESSMENT (CRMRA)**

The “Construction-Renovation-Maintenance Risk Assessment” (CRMRA) planning process establishes criteria to be used and measures to be taken for the protection of patients, healthcare workers, visitors and contractors, from construction/renovation activities which could lead to infections or compromise existing life safety systems in the healthcare facility.

Once the Contractor is selected, they will be required, and the Subcontractors as applicable to participate in the “CRMRA” planning process for orientation of project requirements and help in identifying any additional project needs or risks prior to any contract construction work commencing.

The owner’s representative will work with the contractor to coordinate and facilitate these CRMRA planning activities with MUHC engineering services, infection control department and others as required during the duration of the project.

**SECTION 6 CONSTRUCTION – RENOVATION – MAINTENANCE INFECTION CONTROL RISK MITIGATION CRITERIA**

The “Construction–Renovation–Maintenance Infection Control Risk Mitigation Criteria” (CRMICRMCRMC) is a process to evaluate construction projects for required interventions during construction in order to minimize Hospital Acquired Infections (HAI’s), and controlling dispersal of air and/or water-borne infectious agents concealed within the building components.

All construction activities shall be defined and managed in such a way that occupant’s exposure to dust, moisture and their accompanying hazards is limited.

1. **Construction–Renovation–Maintenance Infection Control Risk Mitigation Criteria and the Construction– Renovation–Maintenance Infection Control Risk Mitigation Permit** which will be used for all MUHC construction and renovation projects.
2. Any work required outside the main project limits will require a NEW Infection Control Risk Assessment.
3. The owner’s representatives and Contractor will work together to coordinate the assessment and determine the requirements and permit.
4. The owner’s representative will ensure that all required infection control interventions and needed life safety measures required for the project are in place by the contractor prior to starting work. (i.e. barrier walls, tacky mats, required exits, etc.)
5. The contractor shall follow all requirements to support the “Construction – Renovation-Maintenance Infection Control Risk Mitigation Criteria”.
6. The contract documents and CRM IC Permit will provide requirements specific to the project.
7. Work outside of construction limits. Prior to contractor performing any work outside of construction limits, the owner’s representative must be notified.
8. Contractors that violate the requirements of the “Construction – Renovation-Maintenance Infection Control Risk Mitigation Criteria/Permit will be removed from the project.

SECTION 7 CONSTRUCTION OF DUST BARRIER WALLS
Infection control is the number one health concern in a construction project. Infection can occur when workers are not cautious about keeping dust, bacteria, mold, etc. from becoming airborne during the construction process. For these reasons, barrier walls are built to isolate dust and fumes in the construction site to separate the patient care and public areas of the healthcare facility.

Dust Barriers Walls and Contamination Reduction
1. A signed copy of the “CRM Infection Control Construction Permit” shall be kept at the job site at all times. Large AND small projects may have several “CRM Infection Control Construction Permits” issued as project phases, needs and assessments evolve.
2. Barriers are required to contain the ceiling envelope, chases, interstitial spaces, etc.
3. When access and exiting to the construction site can only be accomplished through a public area, the interior space of the construction site must be cleaned once every 8 – hour shift to control excessive dust and ventilation filtering issues. Debris shall be removed daily.
4. A temporary fire resistant 6 mil., polyethylene dust barrier is required to control dust while the rigid barrier is being constructed as well as at the end of the job during removal of the rigid barrier.
5. Contractors are responsible to ensure that barrier systems and walls are properly constructed, penetrations sealed and maintained for effectiveness for the duration of the project. Anytime polyethylene is used in a control barrier, it must be fire resistant, 6 mil. See “Approved Equipment and Product Information”.
6. Once barrier walls are built they are required to be cleaned or wiped down prior to the start of work.
7. Barrier doors and exits from the construction site must be installed with a closer and kept in good working order with positive latching.
8. Keep doors closed except when in use in order to minimize migration of dust and to maintain negative air pressure relationships.
9. Doors must have a seal/door sweep installed at the undercut and weather stripping around the metal frame to control the migration of dust from the construction site.
10. Doors in barrier walls which are not in use by the contractor to the public spaces must be sealed off and taped around the door, frame and threshold undercut, in order to minimize migration of dust and to maintain negative air pressure requirements.
11. If an elevator, dumb waiter, pneumatic tube system, stairway, linen chute, or any other chased or open type building system is located within the construction site, a barrier wall system will be required to be built around the open building system from deck to deck and properly sealed at top, bottom and sidewalls.
12. Upon completion of barriers and prior to beginning work, the contractor shall notify the owner’s representative and healthcare construction compliance manager to coordinate an inspection and verify that the barrier wall meets requirements and that acceptable negative air pressure is being achieved.

Special Notes: 1. See “Barrier Wall Design Details” for additional requirements.
2. See section in this manual on "Ventilation and Negative Air Pressure Requirements" for additional requirements when building dust barrier systems and walls.

3. See section in this manual on “Approved Equipment and Product Information”.

SECTION 8  VENTILATION AND NEGATIVE AIR PRESSURE REQUIREMENTS

The first step is building of dust barrier walls to isolate the construction site from patient care and public areas of the healthcare facility to protect patients and the public from construction related dust, fumes and other activities. The effectiveness of barrier walls is minimal unless the construction site is also under negative air pressure. (i.e. air must flow from clean or public spaces into the dirty or construction site).

The following are the “Ventilation and Negative Air Pressure Requirements” which contractors shall strictly follow in the management and construction of their projects.

**Negative Air Pressure Requirements**

1. The contractor shall provide all necessary “Negative Air HEPA Filtered Ventilation Units” required for the negative air requirements of the construction area.
2. See section in this manual on “Approved Equipment and Product Information” for more information.
3. The contractor will work with the owner’s representative to determine best methods and equipment set up requirements for the project.
4. The contractor shall run the “Negative Air HEPA Filtered Ventilation Unit” in the work zone location prior to starting any barrier wall construction or work.
5. “Negative Air HEPA Filtered Ventilation Units”, may be connected to normal or emergency power and shall run continuously, 24/7. Critical areas of the healthcare facility may require the HEPA filtered ventilation units to be connected to emergency power only.
6. A secondary method to maintain negative air pressure is by using the hospitals exhaust system attached to the “Negative Air HEPA Filtered Ventilation Units”. This process and installation must be approved by the owner’s representative.
7. **Pre-Filters shall be changed at least twice weekly during demolition and drywall sanding and a minimum of once a week during other times.** This frequency requirement may be relaxed for lower risk projects and on prior approval from the owner’s representative.
8. The contractor shall furnish and install the negative air-monitoring device to monitor daily negative air pressure - .01 inches of water column. See section in this manual on “Approved Equipment and product Information”.
9. The contractor shall record daily on the “Negative Air Pressure and Filter Change Log” the air pressure reading in the construction area to insure that appropriate negative air pressure is being maintained.
10. See “Negative Air Pressure and Filter Change Log” form at the end of this section.

**Barrier Walls and Negative Air Ventilation**

Special Infection Control Requirements and Interventions for Contractors When Working in (Surgical OR’s, Sterile Processing, Bone Marrow Transplant)

Construction activities can lead to increased Aspergillus counts in the air and increased risk for Aspergillus infections in high risk patients. In an effort to minimize and contain dust, and lessen the possibility of microbial contamination during renovation work in high risk special care units, Interventions are typically initiated and maintained until the completion of the project. The owner’s representative, MUHC infection control and engineering services departments will be involved in contractor orientation for project work procedures in high risk special care units.

Special work scheduling in these special care units may be a requirement of the project and contractor.
# Negative Air Pressure and Filter Change Log

## Project Details
- **Project Name:**
- **Location:**
- **Project Number:**

Contractor to complete the **Negative Air Pressure and Filter Change Log** daily at the start of each work shift and maintain completed forms in the project safety file for future review. Post this log inside construction site entrance for use and review.

## Pressure Relationship Illustration

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## Log Table

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<th>Actions Taken (Filter Change, Pre Filter, HEPA, Other)</th>
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SECTION 9  INTERIM LIFE SAFETY MEASURES ASSESSMENT (ILSM)

Interim Life Safety Measures (ILSM) are a series of administrative actions that must be taken to compensate temporarily for the hazards posed by existing NFPA Life Safety Code 101, 2014 edition deficiencies, other building code issues or construction activities. Examples of when construction activities require ILSM’s to be implemented are as follows:

1. Fire alarm system, detection, and/or sprinkler system are impaired or disabled.
2. Normal exits or exit routes and/or exit lighting have been compromised.
3. Re-routing of traffic due to construction activities.
4. Temporary narrowing of the corridor.
5. Deficiencies in fire and/or smoke separations and systems caused by construction activities. (Changes to wall, door, dampers, penetrations, etc.)
8. Hot work.

Whenever an “Interim Life Safety Measure” is identified for implementation during the construction project, there will typically be measures or actions required by both the MUHC engineering services department as well as the contractor.

The contractor has the responsibility prior to the beginning of work and throughout the project to become familiar with the ILSM in order to plan and identify what construction related activities will require an evaluation of ILSM’s as noted in the ILSM. The “Interim Life Safety Measures Evaluation” is a required team effort.

SECTION 10  NOISE AND VIBRATION CONTROL MANAGEMENT

Construction related noise and vibration control and mitigation measures are to be implemented when the contractor is working in and around healthcare facilities. The contractor shall work with the owner’s representative to develop means and methods for controlling excessive noise and vibration during construction.

SECTION 11  ABOVE CEILING WORK PERMIT

All contractors who need access above ceilings in the public areas of the healthcare facility and outside the approved construction site shall be required to obtain an “Above Ceiling Work Permit” from the owner’s representative prior to disrupting or lifting out ceiling tiles. The contractor shall notify the owner’s representative fourteen (14) days prior to the need for ceiling access in order to process and evaluate any special requirements of the permit.

General Requirements for Working above Ceilings (“Above Ceiling Permit Required”)

1. The Construction-Renovation-Maintenance Infection Control Risk Mitigation Permit issued for the work activity will note specifics required for Barrier Types.
2. Any cable and wiring pulls through the healthcare facility which will require a ceiling disturbance must be approved in advance by obtaining an “Above Ceiling Work Permit”.
3. Ceiling tiles must not be left displaced by the contractor if he walks away from the area unless the area has been contained by an approved “Dust Barrier”.
4. If a ceiling tile is damaged by the contractor he should notify the owner’s representative to acquire a new tile for replacement.
5. All debris shall be cleaned up by the contractor daily when working in cabling and electrical closets.
6. Pulling of communication cables in a patient care or other critical care areas will require special scheduling. Consult with the owner’s representative for coordination.
7. When cables must be pulled in an active patient care unit, a dust partition must be used at the site of entry and exit of the cable.
8. The dust partition may be attached to the false ceiling because taking it to deck may interfere with the work.
9. The site of entry and exit of the cable or other above ceiling work must be HEPA vacuumed (ceiling tiles and pipes) before the work begins.

SECTION 12 LOCK OUT/TAG OUT PERMIT
The contractor shall give a minimum fourteen (14) working days notice to the owner’s representative for shutdown work on electrical systems or other critical utility systems which could significantly impact the healthcare facilities operations. the contractor will be required to plan these “Lock Out/Tag Out” activities ten (14) days in advance. Major utility shutdowns may require weeks of notice and planning. The contractor shall work with the owner’s representative to identify these time planning requirements.

SECTION 13 UTILITY SYSTEMS SHUTDOWN & SERVICE PERMIT
The “Utility Systems Shutdown & Service Permit” is to be used when work on an existing utility system may cause a disruption within the MUHC facility.

“Utility Systems” shall be defined as any system that would hinder the delivery of patient care and hospital operations should the system be interrupted for any reason. Planning for this work usually requires a contingency plan by the healthcare facility management department to address any failure of the utility system.

Utility Shutdown
Any and all utility or system connections, shut-off, or interruptions must be scheduled with the owner’s representative prior to commencement of the work. This work shall be defined as a “Utility Shutdown” and notice shall be made to the owner’s representative to coordinate the request and facilitation.

Utility Service - (System must be worked live or energized)
In addition to utility system connection, shut-off, or interruption, the contractor must also schedule any work on existing utility systems that either do not require interruption or cannot be interrupted to accomplish the work. This type of work shall be defined as “Utility Service” and notice shall be made to the owner’s representative.

The contractor shall give up to 14 working days’ notice to the owner’s representative in order to properly plan and coordinate required activities.
All permits are to be posted at the job site location for the duration of the permit. When complete the contractor shall file the permits in the contractor job safety file for future review as may be required.

SECTION 14 HOT WORK & PERMIT
Hot work shall be defined as welding, brazing, cutting soldering, grinding, or other activities which produce sparks or use flame which are capable of initiating fires or explosions.

All contractors performing construction, renovation and installation work for MUHC facilities are required to follow the requirements and provisions of NFPA 51B and the owner’s representative procedures related to “Hot Work” and obtaining a “Hot Work Permit”.

The following are the requirements for a contractor to obtain a “Hot Work Permit”.

1. Contractors shall contact the owner’s representative two (2) days, forty eight (48) hours in advance to request a hot work permit. A request for complex projects which requires extensive planning on behalf of the owner’s representative may require a longer notice period.
2. All hot work sites are inspected by the owner’s representative using the requirements printed on the “Hot Work Permit”.
3. The owner’s representative will issue a “Hot Work Permit” tag to be attached in the vicinity of the actual hot work being performed. Upon completion, the hot work tag shall be returned to the owner’s representative.
4. **“Hot Work Permits”** will be issued for only one shift unless other arrangements have been made with owner’s representative. All permits expire 30 minutes prior to the end of the shift.

5. If hot work cannot be completed within one work shift, the contractor is responsible for obtaining approval for a revised permit extension from the owner’s representative. The contractor is responsible for meeting all the safety requirements required by the permit for any and all extensions granted.

6. The contractor shall be responsible for supplying a trained worker for the requirement of a fire watch during the actual hot work. The fire watch’s only responsibility will be as a fire watch.

7. A fire watch shall be provided for 30 minutes following the completion of work, including during lunch and breaks by the contractor.

8. The contractor shall provide at a minimum a ten pound (10) ABC fire extinguisher that has a current, valid inspection tag.

9. A copy of the **“Hot Work Permit”** shall be kept in the general contractors project file for future review as may be required.

10. The contractor shall upload completed Hot Work Permits to the owner’s electronic construction document program (Projex 4) in the Hot Work Permit folder for the project not less than on a weekly basis or as instructed by the owner’s representative.

**SECTION 15 EXTERIOR CONSTRUCTION SITE HELICOPTER LANDINGS**

Any contractor doing construction work or activities on the hospital grounds, property or on the roof of the buildings is required to follow the guidelines regarding construction activities during helicopter landings on the helipad. The contractor shall coordinate with the owner’s representative roof access, roof protection, keying, roof and safety precautions to be taken when working close to the roof edge regarding helicopter landings and contractor responsibilities during this time. In addition, the placement of vertical installations such as tall lighting poles and the use of project cranes or hoisting on the hospital property might affect the **“Final Approach and Take Off”** of medical center ambulance helicopters. It is essential that the contractor plans these types of activities with the owner’s representative prior to the beginning of work.
### SECTION 16  REQUIRED FORMS, PERMITS, POSTINGS AND DOCUMENTATION

**Note:** Refer to the sections in the “Healthcare Construction Requirements” manual for detailed information on each form and permit approval procedure.

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<th>Job Site Posting</th>
<th>Contractor Safety File</th>
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<td>Contractor Safety Meeting Minutes</td>
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The contractor will be required to furnish and install a “Project Safety Information” bulletin board on their project site for posting of required safety information. Small, short duration projects may have this requirement waived by the owner’s representative.

**LEGEND**  CRM = Construction-Renovation-Maintenance

### SECTION 17  PROJECT CLEANING AND BARRIER REMOVAL PROCESS

The following is the typical sequence prior to the removal of barrier walls.

1. Clean the covers that are isolating the HVAC ducts.
2. Clean the outside of the negative air HEPA machine and its exhaust duct.
3. The contractor shall notify the owner’s representative to schedule a walk-through of the clean space for inspection and approval prior to removal of the barrier wall.
4. Following all job site cleaning and flushing of plumbing, the contractor can begin the barrier cleaning process.
5. During construction or removal of barrier walls, fire resistant polyethylene barriers must be put into place to help control any construction or demolition dust of the barrier wall system.
6. MUHC must approve removal of any Infection Control or other barriers. Prior to removal of the temporary fire resistant polyethylene barrier, it shall be vacuumed with a HEPA vacuum to eliminate any dust attached to the plastic. The polyethylene barrier is then wiped down with the use of damp cleaning cloths and using a hospital furnished approved infection control cleaning solution. The contractor shall roll or fold the polyethylene in on itself creating as little dust as possible prior to transporting out of the building in a covered cart.

7. Remove the covers or caps from any and all HVAC system supply, return and exhaust ducts and restore the HVAC system.

8. The “Negative Air HEPA Filtered Ventilation Unit” is removed from the project site once the HVAC system is verified is operating properly.

If Air Sampling Is Required
When construction/renovation is done and completed in or near a high risk assessment critical care unit (i.e. Burn Unit, Operating Rooms, Intensive Care, etc.) there may be a requirement to do air sampling after the negative air system has been removed and the building HVAC system has been restored. This will be a requirement only if the infection control department determines the need at the end of the project and prior to occupancy.

SECTION 18 APPROVED EQUIPMENT AND PRODUCT INFORMATION

“NEGATIVE AIR HEPA FILTERED VENTILATION UNIT”, HEPA filter equipped negative air machines that provide rough in filters, primary filters and a HEPA final filter. Rating of 300 to 2000 cubic feet per minute, (CFM). HEPA filters must be a minimum 99.97% efficient @ 0.3 microns. Differential pressure alarm required if not installed in another fashion to monitor construction site negative air of – 0.01 water column. Or approved equal.

- MICRO Trap Corporation, Models MT 1000 or Model MT 2000. 1300 W. Steel Road, No. 2 Morrisville, PA 19067 (215) 295-8208 or (877) 646-8208.
- ABATEMENT Technologies, Inc. Model HEPA-AIRE PAS2400HC Portable Air Scrubber or Model PAS1200HC 605 Satellite Blvd. Suite 300 Suwanee, GA 30024 (800) 634-9091

“HEPA VACUUM”, A shop style vacuum with a HEPA filter cartridge at 99.97% filtration @ 0.3 microns. Or approved equal.

- ABATEMENT Technologies Inc. Model V1300H Hip Mounted HEPA Vacuum, designed for use on scaffolding and mobile conditions such as ceiling tile type cleaning. Lightweight at 6.4 lbs. 605 Satellite Blvd. Suite 300 Suwanee, GA 30024 (800) 634-9091.

“ADHESIVE WALK OFF MATS”, 24” x 36” Tacky Mat. Peel up dirty layer and dispose to reveal a new, fresh clean tacky mat.

- Tacky walk off mat No. 5838 24” x 36”, 60 tacky mats to a unit. Four units per case. 3M Company, St. Paul, MN 55144 (888) 364-3577. Or approved equal.

“NEGATIVE AIR PRESSURE INDICATOR”, Manometer.

- Model “Mark II Model No. 25 inclined-vertical Manometer. Dwyer Instruments Inc. PO Box 373, Michigan City, IN 46361 (219) 879-2000.
- MICRO Trap Corporation, Model Tri/Mon, digital recording manometer for tracking differential pressure. 1300 W. Steel Road, No. 2 Morrisville, PA 19067 (215) 295-8208 or (877) 646-8208.
“PORTABLE WORK ENCLOSURE”, For temporary fire resistant polyethylene dust barrier. System components supplier of zip poles, door opening access zippers, dust sealing system parts, etc.

- Zip Wall, LLC. 37 Broadway, Arlington, MA 02474 (800) 718-2255. Or approved equal.


Example of Badge for Contractor use -
SECTION 19 HEALTHCARE CONSTRUCTION CLEANING DEFINITIONS

Construction Clean
1. Remove tools & equipment from the work area.
2. Remove all bulk trash from the work area.
3. Thoroughly sweep all floor surfaces in the work area utilizing a dust compound (floor sweep) material.
4. Dry wipe all horizontal & vertical surfaces in the work area. Surfaces to include but not limited to walls, window sills, doors & door frames, base trim, casework (inside & out), fixtures, and wall-mounted equipment.
5. Sweep all floor surfaces utilizing a dust mop.
6. Wet mop all floor surfaces.

Thorough Clean
1. To be implemented only after Construction Clean procedures have been completed.
2. Wet wipe all horizontal and vertical surfaces utilizing a MUHC – Infection Control Department approved germicidal disinfectant. Surfaces to include but not limited to walls, window sills, doors & door frames, base trim, casework (inside & out), all fixtures, and wall-mounted equipment.
3. Wet mop all floor surfaces utilizing a MUHC Infection Control Department approved germicidal disinfectant.

Terminal Clean
1. To be implemented only after Thorough Clean procedures have been completed.
2. Cleaning procedures shall be conducted by MUHC trained Environmental Services, Sterile Processing or Surgical Services staff only.
3. Thoroughly clean and disinfect surfaces on the ceiling such as diffusers, light fixtures, and ceiling mounted devices & equipment.
4. Thoroughly clean and disinfect all equipment in the work area.
5. Thoroughly clean and disinfect all flooring including moving equipment & furnishings to allow access to all floor surfaces.
6. Move all portable equipment and furnishings away from the walls. Wet wipe and disinfect all wall surfaces and wall mounted equipment.
1. **GENERAL**
   a) Time is of the essence for this contract. The time frames spelled out in this contract are essential to the success of this project. The University understands that effective schedule management, in accordance with the General Conditions and these Special Conditions is necessary to ensure that the critical milestone and end dates spelled out in the contract are achieved.
   b) Related Documents
      Drawings and general provisions of the Contract, including General Conditions’ Article 3.17 shall apply to this Section.
   c) Stakeholders
      A Stakeholder is anyone with a stake in the outcome of the Project, including the University, the University Department utilizing the facility, the Design Professionals, the Contractor and subcontractors.
   d) Weather
      1) Contractor acknowledges that there will be days in which work cannot be completed due to the weather, and that a certain number of these lost days are to be expected under normal weather conditions in Missouri.
      2) Rather than speculate as to what comprises “normal” weather at the location of the project, Contractor agrees that it will assume a total of 44 lost days due to weather over the course of a calendar year, and include same in its as planned schedule. For projects of less than a calendar year, lost weather days should be prorated for the months of construction in accordance with the following schedule.
      3) Anticipated weather days for allocation/proration only. For projects lasting 12 months or longer, the 44 days per year plus whatever additional months are included will constitute normal weather.

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2. **SCHEDULING PROCESS**
   a) The intent of this section is to ensure that a well-conceived plan, that addresses the milestone and completion dates spelled out in these documents, is developed with input from all stakeholders in the project. Input is limited to all reasonable requests that are consistent with the requirements of the contract documents, and do not prejudice the Contractor’s ability to perform its work consistent with the contract documents.
   Further, the plan must be documented in an understandable format that allows for each stakeholder in the project to understand the plan for the construction and/or renovation contained in the Project.
   b) Contractor Requirements
      1) Schedule Development
         Contractor shall prepare the Project Schedule using Primavera SureTrack or P3, Microsoft Project, Oracle P6, or other standard industry scheduling software, approved by the Owner’s Representative.
      2) Schedule Development
         Within 2 weeks of the NTP, contractor shall prepare a schedule, preferably in CPM format, but in detailed bar chart format at a minimum, that reflects the contractor’s and each subcontractors plan for performing the contract work.
Contractor shall review each major subcontractor’s schedule with the sub and obtain the subcontractor’s concurrence with the schedule, prior to submitting to the University.

(3) Schedule Updates.
   (a) Schedule Updates will be conducted once a month, at a minimum. Actual Start and Finish dates should be recorded regularly during the month. Percent Complete, or Remaining Duration shall be updated as of the data date, just prior to Contractor’s submittal of the update data.
   (b) Contractor will copy the previous months schedule and will input update information into the new monthly update version.
   (c) Contractor will meet with the Owner’s Representative to review the draft of the updated schedule. At this meeting, Owner’s Representative and Contractor will:
      (i) Review out of sequence progress, making adjustments as necessary,
      (ii) Add any fragnets necessary to describe changes or other impacts to the project schedule and
      (iii) Review the resultant critical and near critical paths to determine any impact of the occurrences encountered over the last month.

(4) Schedule Narrative
   After finalization of the update, the Contractor will prepare a Narrative that describes progress for the month, impacts to the schedule and an assessment as to the Contractor’s entitlement to a time extension for occurrences beyond its control during the month and submit in accordance with this Section.

(5) Progress Meetings
   (a) Review the updated schedule at each monthly progress meeting. Payments to the Contractor may be suspended if the progress schedule is not adequately updated to reflect actual conditions.
   (b) Submit progress schedules to subcontractors to permit coordinating their progress schedules to the general construction work. Include 4 week look ahead schedules to allow subs to focus on critical upcoming work.

3. CRITICAL PATH METHOD (CPM)
   a) This Section includes administrative and procedural requirements for the critical path method (CPM) of scheduling and reporting progress of the Work.
   b) Refer to the General and Special Conditions and the Agreement for definitions and specific dates of Contract Time.
   c) Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.
   d) Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.
   e) Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.
   f) Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling, the construction project. Activities included in a construction schedule consume time and resources.
   g) Critical activities are activities on the critical path.
   h) Predecessor activity is an activity that must be completed before a given activity can be started.
   i) Milestone: A key or critical point in time for reference or measurement.
j) Float or Slack Time: The measure of leeway in activity performance. Accumulative float time is not for the exclusive use or benefit of the Owner or Contractor, but is a project resource available to both parties as needed to meet contract milestones and the completion date.

k) Total float is herein defined as the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.

l) Weather: Adverse weather that is normal for the area must be taken into account in the Contractor's Project Schedule. See 1.d.3, above.

m) Force Majeure Event: Any event that delays the project but is beyond the control and/or contractual responsibility of either party.

n) Schedule shall including the following, in addition to Contractor’s work.

   (1) Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:
       (a) Requirements for phased completion and milestone dates.
       (b) Work by separate contractors.
       (c) Work by the Owner.
       (d) Coordination with existing construction.
       (e) Limitations of continued occupancies.
       (f) Uninterruptible services.
       (g) Partial occupancy prior to Substantial Completion.

o) Area Separations: Use Activity Codes to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a "major area" is a story of construction, a separate building, or a similar significant construction element.

4. TIME EXTENSION REQUEST
   a) Refer to General Conditions of the Contract for Construction, Article 4.7 Claims for Additional Time.
   b) Changes or Other Impacts to the Contractor’s Work Plan
      The Owner will consider and evaluate requests for time extensions due to changes or other events beyond the control of the Contractor on a monthly basis only, with the submission of the Contractor’s updated schedule, in conjunction with the monthly application for payment. The Update must include:
      (1) An activity depicting the event(s) impacting the Contractors work plan shall be added to the CPM schedule, using the actual start date of the impact, along with actually required predecessors and successors.
      (2) After the addition of the impact activity(ies), the Contractor will identify subsequent activities on the critical path, with finish to start relationships that can be realistically adjusted to overlap using good, standard construction practice.
          (a) If the adjustments above result in the completion date being brought back within the contract time period, no adjustment will be made in the contract time.
          (b) If the adjustments above still result in a completion date beyond the contract completion date, the delay shall be deemed excusable and the contract completion date shall be extended by the number of days indicated by the analysis.
          (c) Contractor agrees to continue to utilize its best efforts to make up the time caused by the delays. However, the Contractor is not expected to expend costs not contemplated in its contract, in making those efforts.
   c) Questions of compensability of any delays shall be held until the actual completion of the project. If the actual substantial completion date of the project based on excusable delays, excluding weather delays, exceeds the original contract completion date, AND there are no delays that are the responsibility of the contractor to consider, the delays days shall be considered compensable. The actual costs, if any, of the Contractor’s time sensitive jobsite supervision and general conditions costs, shall be quantified and a change order issued for these costs.
### SHOP DRAWING AND SUBMITTAL LOG

**Project:** MUHC BAS Upgrades  
**Project Number:** CP171064  
**Contractor:**

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## OPERATING INSTRUCTIONS AND SERVICE MANUAL LOG

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**Project Number:** CP171064  
**Contractor:**

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<th>Service &amp; Maintenance Instructions</th>
<th>Parts List &amp; Availability</th>
<th>Performance Curves</th>
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## Building System Commissioning

### Commissioning Agent - Conduct pre-installation meetings per specifications.

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### Penetration Firestopping

Do not enclose firestopping with other construction until inspection has been completed.

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### Basic Mechanical Materials and Methods

Hold MEP pre-installation meeting(s).

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### Testing, Adjusting, and Balancing

Coordinate temperature control testing and adjusting with temperature controls contractor.

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Hold Pre balancing conference as specified.

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<th>Coord Initial</th>
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<td></td>
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<td>Meeting Minutes</td>
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Perform start up & shut down operation by factory representative.

<table>
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<th>Name</th>
<th>Firm</th>
<th>Date compl</th>
<th>Coord Initial</th>
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<th>Owner Witness Required</th>
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Provide craftsmen of the proper trades to make adjustments/changes during TAB.

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<thead>
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<th>Verified by:</th>
<th>Name</th>
<th>Firm</th>
<th>Date compl</th>
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Provide Owner with manufacturers outlet factors and recommended procedures for testing.

<table>
<thead>
<tr>
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<th>Name</th>
<th>Firm</th>
<th>Date compl</th>
<th>Coord Initial</th>
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<th>Owner Witness Required</th>
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</tr>
<tr>
<td>Commissioning Items by CSI Division</td>
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<td>Firm</td>
<td>Date compl</td>
<td>Coord Initial</td>
<td>Documentation Required</td>
<td>Owner Witness Required</td>
</tr>
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<tr>
<td><strong>230900</strong> Control Systems</td>
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<td></td>
<td>Test Report</td>
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<tr>
<td>Check and record amp draw on supply transformers of control panels</td>
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<tr>
<td>Ensure shipping material has been removed from thermostats and other control devices</td>
<td></td>
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<tr>
<td>Verify all field devices provided by contractor are terminated</td>
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<td>Verify method of labeling used for identification has been defined to the Owners Representative</td>
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<td>Test Report</td>
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<tr>
<td>Test piping per Field Quality Control Section of specifications. Use 1.5 times working pressure. Or 100 psi, whichever is greater.</td>
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<td>Perform Field Quality Control section of specifications</td>
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<td>Train all End Users on the equipment they will use on a periodic basis.</td>
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<td>Sign-in Sheet</td>
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<td>Verify that every penetration through fire walls (re: life safety plans) has been properly firestopped</td>
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<td></td>
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<td>certification</td>
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<td><strong>260519</strong> Conductors and Cables</td>
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<td>Perform independent tests per &quot;Field Quality Control&quot; section of spec, including megohm/high pot tests</td>
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<tr>
<td>Commissioning Items by CSI Division</td>
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<td>Date compl</td>
<td>Coord Initial</td>
<td>Documentation Required</td>
<td>Owner Witness Required</td>
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<td><strong>260526</strong> Grounding and Bonding</td>
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<td>test reports</td>
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<td>Conduct grounding Inspections and tests per specifications</td>
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<td><strong>260553</strong> Identification for Electrical Systems</td>
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</tr>
<tr>
<td>Ensure identification devices are applied per specifications</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Please see following website for suggested commissioning forms:

https://www.cf.missouri.edu/cf/pdc/commissioning-forms
SECTION 1.F

INDEX OF DRAWINGS


G000         Cover Sheet
G001         Phasing + Infection Control
G002         Phasing + Infection Control
G100         UMTH – Ground Floor Life Safety Plan
G102         UMTH – Second Floor Life Safety Plan
M000         Mechanical Symbols, Abbreviations & General Notes
MD100        UMTH - Ground Floor Mechanical Plan – Demolition
MD102        CCA - Second Floor Mechanical Plan – Demolition
MD200        MOI - First Floor Mechanical Plan – Demolition
M100         UMTH - Ground Floor Mechanical Plan – New Work
M100-REF     Reference Ground Floor Mechanical Plan
M101         CCA – Mechanical Room Plans – New Work
M102         CCA –Second Floor Mechanical Plan – New Work
M102-REF     Reference Second Floor Mechanical Plan
M103         UMTH - Second Floor Mechanical Room Plan – New Work
M104         UMTH - Third Floor Mechanical Room Plan – New Work
M105         UMTH - Third Floor Mechanical Room 3E27 Plan – New Work
M106         UMTH - Fourth Floor Mechanical Room Plan – New Work
M107         UMTH - Mechanical Roof Plan – New Work
M108         PCT - Ground Floor Mechanical Room Plan – New Work
M109         PCT - Mechanical Penthouse Plan – New Work
M200         MOI - First Floor Mechanical Plan – New Work
M201         MOI - Fifth Floor Mechanical Plan North – New Work
M202         MOI - Fifth Floor Mechanical Plan South – New Work
M600         Schedules & Details
M700         Temperature Controls
M701         Temperature Controls
E100         UMTH - Electrical Plan – New Work
E102         CCA – Electrical Plan – New Work

END OF SECTION
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Missouri
Division of Labor Standards
WAGE AND HOUR SECTION

MICHAEL L. PARSON, Governor

Annual Wage Order No. 26
Section 010
BOONE COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Taylor Burks, Director
Division of Labor Standards

Filed With Secretary of State: March 8, 2019

Last Date Objections May Be Filed: April 8, 2019

Prepared by Missouri Department of Labor and Industrial Relations
<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>** Date of Increase</th>
<th>Basic Hourly Rates</th>
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<tbody>
<tr>
<td>Asbestos Worker</td>
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<tr>
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<td>Lineman - Tree Trimmer</td>
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<td></td>
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<tr>
<td>Groundman</td>
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<tr>
<td>Groundman - Tree Trimmer</td>
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<tr>
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<td>Tile Setter</td>
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<tr>
<td>Truck Control Service Driver</td>
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<td>Group I</td>
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<td>Group II</td>
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<td>Group III</td>
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<tr>
<td>Group IV</td>
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</tbody>
</table>

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSNo 290.257.2.*

**Annual Incremental Increase**  

ANNUAL WAGE ORDER NO. 26  

3/19
### Heavy Construction Rates for BOONE County

<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>** Date of Increase</th>
<th>Basic Hourly Rates</th>
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<tbody>
<tr>
<td>Carpenter</td>
<td></td>
<td>$49.38</td>
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<tr>
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<td></td>
<td>$69.22</td>
</tr>
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</tr>
<tr>
<td>Lineman - Tree Trimmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundman - Tree Trimmer</td>
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<td></td>
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<tr>
<td>Laborer</td>
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<tr>
<td>Group IV</td>
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</tr>
<tr>
<td>Truck Driver</td>
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<td>$24.71*</td>
</tr>
<tr>
<td>Truck Control Service Driver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I</td>
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<tr>
<td>Group II</td>
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</tr>
<tr>
<td>Group IV</td>
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</tr>
</tbody>
</table>

**Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).**

**Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).**

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.*
SECTION 1.H

ALTERNATES

Base Bid may be increased in accordance with following Additive Alternate proposal(s) as Owner may elect:

1. Additive Alternate No. 1: Not applicable.
2. Additive Alternate No. 2: Not applicable.

END OF SECTION
SECTION 07 8413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Penetrations in fire-resistance-rated walls.
   2. Penetrations in horizontal assemblies.

1.2 SUBMITTALS

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

B. Related Sections include the following:
   1. Division 26 Sections specifying cable and conduit penetrations.

C. Product Data: For each type of product indicated.

D. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
   1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

E. Certify that each firestopping installer has passed qualification tests for the processes involved and that certification is current.
   1. Contactor shall retain all certifications on file and produce them for review upon request by the Owner and/or Owner's representative.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A firm certified in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
   a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
   b. Classification markings on penetration firestopping correspond to designations listed by the following:
      1) UL in its "Fire Resistance Directory."
      2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
      3) FM Global in its "Building Materials Approval Guide."

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.5 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's inspecting agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

D. Proposed firestop materials and methods shall conform to applicable governing codes having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hilti, Inc.
2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is 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 construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
   1. Fire-resistance-rated walls include fire walls.
   2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
   1. Horizontal assemblies include floors.
   2. F-Rating: At least 2 hour, but not less than the fire-resistance rating of constructions penetrated.
   3. T-Rating: At least 2 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

F. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
   1. Permanent forming/damming/backing materials, including the following:
      a. Slag-wool-fiber or 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. Substrate primers.
3. Temporary forming materials.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

D. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

E. 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.

F. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

G. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration 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 of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration 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 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 penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.


C. Manufacturer’s Instructions: Comply with manufacturer’s written installation instructions and published drawings for products and applications indicated.

D. Install forming 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.

E. 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 the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
4. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

3.4 FIELD QUALITY CONTROL

A. All areas of work must be accessible until inspection by the applicable Code Authorities.
B. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification at no additional cost to the Owner.
   1. Identify damaged, improperly installed or re-entered seals for repair or modification.
   2. Modifications to penetrations shall be accomplished per the firestop material manufacturer’s recommendations.
   3. Only materials used in original seal and designated by the manufacturer as suitable for said repair shall be used for this purpose.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration 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 that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.6 IDENTIFICATION

A. Penetration Identification: Identify each penetration firestopping system with legible wall applied fire stop tags. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

END OF SECTION 07 8413
SECTION 23 0500 – BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following basic mechanical materials and methods to complement other Division 23 Sections:

1. Materials and installation instructions common to mechanical systems.
2. Pipe joining materials and methods.
3. Dielectric fittings.
4. Labeling and identifying mechanical systems and equipment.
5. Selective Demolition.
6. Cutting and patching.
7. Operation and Maintenance Manuals.

1.2 RELATED DOCUMENTS

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

B. Pipe and pipe fitting materials are specified in individual Division 23 piping system Sections.

1.3 DEFINITIONS

A. 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.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

1.4 SUBMITTALS

A. Product Data: For identification materials and devices.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and
moisture. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor if stored thereupon. Protect fittings and piping specialties from moisture and dirt.

B. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate installation with other building components.

B. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

C. 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.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Refer to the Division 01 Section: “Closeout Procedures” for procedures and requirements for preparation and submittal of maintenance manuals.

B. In addition to the information required by Division 01 for Maintenance Data, include the following information:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.

2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

4. Servicing instructions and lubrication charts and schedules.

C. Submit one (1) properly indexed and bound copies in “D” ring style notebooks, of the Operations and Maintenance Instructions to the Architect or Engineer. Make all corrections or additions required.

1. Provide the same documentation in the same order and organization within a combined, searchable PDF.

D. Operation and Maintenance Instructions shall be a searchable pdf and include the following:

1. Notebooks shall be heavy duty locking three-ring binders, black in color, and incorporate clear vinyl sheet sleeves on the front cover and spine for slip-in labeling. “Peel and stick” labels are not acceptable. Sheet lifters shall be supplied at the front of each notebook. Size notebooks a minimum of 1/2 inch thicker than the material for future inserts. Label the spine and front cover of each notebook. If more than one notebook is required, label...
in consecutive order. For example; 1 of 2, 2 of 2. No other forms of binding will be acceptable.

2. Prepare binder covers (front and spine) with printed title “Operation and Maintenance Instructions,” title of project, and subject matter of binder when multiple binders are required.

3. Title page with project title, Architect, Engineer, Contractor, and Subcontractor with addresses, telephone numbers, and contacts.

4. Table of Contents describing all index tabs.

5. Listing of all Subcontractors and major equipment suppliers with addresses, telephone numbers and contacts.

6. Index tabs dividing information by specification section, major equipment, or systems. All tab titles shall be clearly printed under reinforced plastic tabs. Label all equipment to match the identification in the construction documents.


8. Copies of all final approved shop drawings and submittals.

9. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.

10. Dimensional drawings of equipment.

11. Detailed parts lists, each with a list of suppliers.

12. Operating procedures for each system.

13. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.

14. Replacement parts and service material requirements for each system and the frequency of service required.

15. Instruction books, cards, and manuals furnished with the equipment.

E. Operation and maintenance data shall consist of written instructions for the care, maintenance, and operation of the equipment and systems. Instruction books, cards, manuals furnished with the equipment shall be included.

F. Adequately instruct the Owner’s designated representative in the maintenance, care, and operation of the complete systems installed under this contract.

G. Provide verbal and written instructions to the Owner’s representatives by factory personnel in the care, maintenance and operation of the equipment and systems.

H. The instructions shall include:

1. Maintenance of equipment.

I. Notify the Engineer of the time and place for the verbal instructions to the Owner’s representative so his representative can be present if desired.

J. Minimum hours of instruction time for each item and/or system shall be as indicted in each individual specification section.

K. Operating Instructions:

1. Include instructions to the Owner’s representatives for the electrical and specialized systems, using factory-authorized technical representatives.
PART 2 - PRODUCTS

2.1 PIPE AND PIPE FITTINGS
   A. Refer to individual Division 23 piping Sections for pipe and fitting materials and joining methods.

2.2 JOINING MATERIALS
   A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
   B. Solder Filler Metals: ASTM B32 lead-free alloys. Include water-flushable flux according to ASTM B813.

2.3 DIELECTRIC FITTINGS
   A. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face type. Components shall include EPDM gasket, phenolic or polyethylene bolt sleeves designed to prevent any metal-to-metal contact across mating flanges; phenolic washers, and steel backing washers. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures. Copper pipe flange shall be soldered-on companion flange in sizes ¾-inch and larger; steel pipe flange shall be threaded-on in sizes ¾-inch to 2-inch. Other flanges and flange bolting kits are specified in “Joining Materials” subsection above.
   B. Dielectric Waterway Fittings: ASTM A-53 zinc electroplated casing with inert non-corrosive thermos-plastic lining with grooved end to threaded end, threaded end to threaded end, and grooved steel end to grooved copper end fittings. Waterway shall create a dielectric waterway by insulating the inside of the metal casing, inhibiting the internal formation of galvanic local cell corrosion between dissimilar metals in the presence of water. Fittings to meet the requirements of ASTM F-1545-97. Fittings shall be designed for continuous use at temperatures up to 230°F (110°C) and pressures up to 300 psig (2065 kPa). Victaulic Style 47-TT or approved equal.

PART 3 - EXECUTION

3.1 GENERAL MECHANICAL INSTALLATION REQUIREMENTS
   A. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
3.2  PIPING SYSTEM INSTALLATION REQUIREMENTS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Division 23 piping Sections specify unique piping installation requirements.

B. Install components with pressure rating equal to or greater than system operating pressure.

C. Piping Support: As specified in Division 23 Section “Hangers and Supports.”

3.3  PIPING JOINING REQUIREMENTS

A. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B828 or CDA’s “Copper Tube Handbook,” using lead-free solder alloy complying with ASTM B32.

3.4  SELECTIVE DEMOLITION

A. Disconnect, demolish, and remove mechanical work as indicated on the Drawings, and as required for installation of new work shown. Coordinate with Division 26 for disconnection of power to electrically-powered equipment prior to demolition.

B. Remove accessible work in its entirety. Repair cut surfaces to match adjacent surfaces. Abandon in place embedded or buried work, unless noted otherwise.

C. Removal: Unless otherwise indicated, remove demolished pipe from the Project site. Handle and dispose of in accordance with National, State, and Local regulations.
   1. Salvage: Remove and deliver to Owner all work indicated for salvage.

D. Refer to Division 01 Sections “Selective Demolition” for additional requirements.

3.5  CUTTING AND PATCHING

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Perform cutting and patching in accordance with the following:

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

C. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
1. Uncover Work to provide for installation of ill-timed Work.
2. Remove and replace defective Work.
3. Remove and replace Work not conforming to requirements of the Contract Documents.

D. Cut, remove and legally dispose of selected components, and materials as indicated, including but not limited to removal of mechanical piping and other mechanical items made obsolete by the new Work.

E. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.

F. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

G. Repair cut surfaces to match adjacent installations.

H. Repair any building insulation or building fireproofing materials, whether new or existing, that are removed or scraped away in order to make a mechanical installation, so as to maintain an equivalent insulation or fire rating as existed without said mechanical installation.

END OF SECTION 23 0500
SECTION 23 0593 – TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions apply to this section.

1.2 SUMMARY

A. This scope of services specifies the requirements and procedures for mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the airflow quantities of the mechanical systems as required to meet design specifications and recording and reporting the results. The test and balance work will be performed by the Owner’s personnel. It is the Contractor’s responsibility to assist as outlined below.

B. Test, adjust and balance the following mechanical systems which are shown in the construction documents.

1. Supply air systems, all pressure ranges, including variable volume and constant volume systems.
2. Verify temperature control system operation.

C. The Contractor’s responsibilities are as follows:

1. Notify the Owner’s Representative two weeks prior to the schedule date for balancing the system.
2. Schedule a two (2) week allowance for the testing and balancing firm to complete the testing and balancing work, when scheduling completion of all work required of the Contractor by the contract documents.
3. Cooperate with the testing and balancing firm and make all necessary preparations for the TAB efforts.
4. Complete the following work prior to requesting the TAB effort.
   a. Service and tag all equipment.
   b. Start up and prove all equipment and systems.
   c. Make preliminary settings on all control devices and have all systems operational.
   d. Operate all systems successfully for twenty-four (24) hours minimum.
5. Attend a coordination meeting prior to the balancing of the system and a coordination meeting following the balancing of the system.
6. Provide craftsmen of the proper trade to work with the TAB firm to make adjustments and installation changes as required.
7. Dedicate the resources to accommodate all changes identified by the test and balance firm in a timely manner.
8. If a significant rebalance (Owner’s determination) of the HVAC system is required due to the Contractor’s failure to properly install and check out the HVAC system, the cost of rebalancing the system shall be borne by the Contractor.

1.3 PRE-BALANCING CONFERENCE

A. Prior to beginning of the testing, adjusting and balancing procedures, a conference with the Owner’s representative, Engineer and the Test and Balance Agency’s representative will be held. The objective of the conference is final coordination and verification of system operation and readiness for testing, adjusting and balancing.
SECTION 23 0900 - CONTROL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. University of Missouri Controls Specification.

B. This section contains requirements for electric and digital control systems as indicated on the contract drawings.

C. Contractor is responsible for providing, installing and connecting all sensors, actuators, control valves, electrical components and all interconnecting electrical wiring between these devices and up to the Direct Digital Controller (DDC).

D. DDC controllers consist of Johnson Controls METASYS controllers, type NAE, DX, FEC, IOM, AHU, VAV, VMA, or UNT controllers. Owner will provide Johnson Controls METASYS controllers for the contractor to install.

E. Contractor will be responsible for all termination connections at the DDC controller’s and for checking, testing, programming and start-up of the control system and make any necessary hardware adjustments as required.

F. Once each mechanical system is completely operational under the new control system, contractor shall make any final connections and adjustments. For controls renovation jobs, contractor shall remove all unused sensors, operators, panels, wiring, tubing, conduit, etc. Owner shall have the option of retaining any removed pneumatic controls.

1.2 RELATED SECTIONS

A. Drawings and general provisions of Contract, including General and Special Conditions apply to work of this section.

B. Section 26 0533 “Raceways,” apply to the work of this Section as if fully repeated herein.

1.3 QUALITY ASSURANCE

A. Contractor's Qualifications:

1. Contractor shall be regularly engaged in the installation of digital control systems and equipment, of types and sizes required. Contractor shall have a minimum of five years experience installing digital control systems. Contractor shall supply sufficient and competent supervision and personnel throughout the project in accordance with General Conditions section 3.4.1 and 3.4.4.
B. Codes and Standards:

1. Electrical Standards: Provide electrical components of control systems which have been UL-listed and labeled, and comply with NEMA standards.
2. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for control systems.
3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

1.4 SUBMITTALS

A. Shop Drawings: Submit shop drawings for each control system, containing the following information:

B. Product data for each valve and control device.

C. Label each control device with setting or adjustable range of control.

D. Indicate all required electrical wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.

E. Provide details of faces on control panels, including controls, instruments, and labeling.

F. Provide wiring diagrams of contractor provided interface and I/O panels.

G. Provide field routing of proposed network bus diagram listing all devices on bus.

H. Provide record drawing of installed network bus.

PART 2 - PRODUCTS

1.5 MATERIALS AND EQUIPMENT

A. Conduit and Raceway:

1. Electrical Metallic Tubing: EMT and fittings shall conform to ANSI C80.3.

B. Control Valves:

1. Manufacturer
   a) TAC or approved equal. TAC shall be used as the basis of design.
   b) KMC valves and actuators not approved.

2. Hot Water
   a) Water Service Valves: Equal percentage characteristics.
b) Single Seated Valves: Cage type trim, providing seating and guiding surfaces for plug on "top and bottom" guided plugs.

c) Valve Trim and Stems: Polished stainless steel.
d) Packing: Spring-loaded Teflon, self-adjusting.
e) Control valves should have a minimum 100 psi close-off rating for chilled water applications.

C. Electric Actuators: Johnson Controls, Bray, Belimo, TAC or approved equal. KMC actuators are not approved. Size electric actuators to operate their appropriate valves with sufficient reserve power to provide smooth modulating action as specified. Control signal shall be 0 to 10 VDC unless otherwise specified on drawings. For VAV reheat valves, actuators shall have a manual override capability to aid in system flushing, startup, and balancing.

D. Air and Hot Water Electronic Temperature Sensors:

1. All electronic temperature sensors shall be compatible with Johnson METASYS systems.
2. Sensors shall be 1,000 ohm platinum, resistance temperature detectors (RTDs) with two wire connections. Duct mounted sensors shall be averaging type. Contractor may install probe type when field conditions prohibit averaging type, but must receive permission from Owner's Representative.
3. Coordinate thermowell manufacturer with RTD manufacturer. Thermowells that are installed by the contractor, but are to have the RTD installed by owner, must be Johnson Controls Inc. series WZ-1000.

H. Power Supply Used to Provide Power to Contractor-Provided Control Devices: Shall have adjustable DC output, screw terminals, overload protection and 24 VAC and 24 VDC output.

1.6 FILTER PRESSURE MONITOR

A. Description: Microprocessor type with LCD display, pushbutton auto-zero and span, bidirectional pressure and digital input; Setra Model MRG or approved equal.

1. Range: 0- to ±2.5-inch wg.
2. Housing: Stainless steel with acrylic cover.
3. Mounting bracket for surface mounting.
5. Accuracy: ±1% of full scale throughout range.
6. Output signal: 4-20 mA.
7. Power Requirements: 30mA maximum (2 wire).

B. Required Accessories: Static pressure connections, polyethylene tubing, conduit fitting for wiring, and mounting brackets.

1.7 ROOM PRESSURE MONITOR

A. A room pressure monitor system shall be furnished and installed to measure and display the measured room pressurization independent of supply and return flow volumes. The system shall ensure that the air pressure of the space is positive with respect to the corridor.

B. Unit shall be Triatek Model FMS-1655M.
1. Accuracy: 0.5% of full scale.
2. Range: +/ - 0.2500” w.c.
3. Output signal: 4-20 mA.
4. Power Requirements: 30 VA.

C. Provide manufacturers step down isolation transformer.

D. The monitor shall be capable of displaying room mode and alarm status.

E. Local audible and visual alarms and relay contacts shall be enabled whenever either measured room pressure differential falls below its user configurable low alarm set point or rises above its user configurable high alarm set point, after a configurable delay. The primary, second and third pressure sensors shall have individual alarm set points for high and low alarms. A mute function shall temporarily silence the audible alarm for a user configured delay. Manual or automatic reset of the alarms shall be configurable.

F. The room pressure monitor shall have the ability to communicate with a building automation system (BMS) via BACnet® MS/TP communication protocols. Communication shall be native to the monitor device and not require an external interface or gateway.

G. Missouri Orthopaedics Institute (MOI) pressure monitors shall be surface mounted. University of Missouri Teaching Hospital (UMTH) pressure monitors shall be flush mounted.

PART 3 - EXECUTION

1.8 INSTALLATION OF CONTROL SYSTEMS

A. General: Install systems and materials in accordance with manufacturer’s instructions, roughing-in drawings and details shown on drawings.

B. Raceway: Raceway is to be installed in accordance with the National Electric Code.

C. Control Wiring: Install control wiring without splices between terminal points. Control wiring installed in mechanical rooms and chases to be installed in conduit. Install in a neat workmanlike manner, securely fastened. Install in accordance with National Electrical Code.

1. Install circuits over 25-volt with color-coded No. 12 stranded wire.
2. Install electronic circuits and circuits under 25-volts with color-coded No. 18 stranded twisted shielded pair type conductor.
3. N2 communications bus wire shall be 18 AWG, plenum rated, stranded twisted shielded, 3 conductor, with blue outer casing, described as 18-03 OAS STR PLNM NEON BLU JK distributed by Windy City Wire, constructed by Cable-Tek, or approved equivalent.
   a) Metastat wiring shall be minimum 20 AWG, plenum rated, stranded, 8 conductor stranded wire.
4. FC communications bus wire shall be 22 AWG, plenum rated, stranded twisted shielded,
3 conductor, with blue outer casing, described as 22-03 OAS STR PLNM NEON BLU JK distributed by Windy City Wire, constructed by Cable-Tek, or approved equivalent.

a) Network sensor wiring (SA Bus) shall be 22 gauge plenum rated stranded twisted wire, 4 conductor.

5. All control wiring at control panel shall be tagged and labeled during installation to assist owner in making termination connections at control panel. Label all control wires per bid documents.

D. All low voltage electrical wiring shall be run as follows:

1. Route electrical wiring in concealed spaces and mechanical rooms whenever possible.
2. Provide EMT conduit and fittings in mechanical rooms, chases, and where indicated on drawings.
3. Low voltage electrical wiring routed above acoustical ceiling is not required to be in conduit, but wire must be plenum rated and properly supported to building structure.

E. All devices shall be mounted appropriately for the intended service and location.

1. Tubing and/or wiring shall be concealed within the wall up to the ceiling where ever possible. Surface raceway may only be used with approval of Owners Representative. Duct mounted sensors shall be provided with mounting brackets to accommodate insulation. Mounting clips for capillary tubes for averaging sensors are required.
2. All control devices shall be tagged and labeled for future identification and servicing of control system.
3. All field devices must be accessible or access panels must be installed.

F. Install differential pressure transducer across each air handling unit final filter bank where noted on the drawings. Install differential pressure transducer with separate static-pressure taps upstream across final filter bank. Mount on outside air handling unit housing in an accessible location. Adjust and level per manufacturers installation instructions.

1.9 ADJUSTING AND START-UP

A. The start-up, testing, and adjusting of digital control systems will be conducted by owner. Once all items are completed by the Contractor for each system, Contractor shall allow time in the construction schedule for owner to complete commissioning of controls before project substantial completion. This task should be included in the original schedule and updated to include the allotted time necessary to complete it. As a minimum, the following items are required to be completed by the Contractor for Owner to begin controls commissioning.

1. Process Control Network

a) The control boards and enclosures need to be installed in the mechanical rooms.
b) The fiber optic conduit and box for the process control network needs to be installed. Once in place, Owner needs to be contacted so the length of the owner provided fiber cable can be determined and ordered, if required. Coordinate with Owner to schedule the pull in and termination of the fiber cable. Power should be in place at that time. (Fiber for the process control network is required to allow metering of utilities prior to turn on.)
2. VAVs

   a) Power, (FC or N2 bus), and control wire installed before owner can make first commissioning pass. First pass includes installation of VAV controller, termination of power, control and network communication wiring.

1.10 CLOSEOUT PROCEDURES

   A. Contractor shall provide complete diagrams of the control system including flow diagrams with each control device labeled, a diagram showing the termination connections, and an explanation of the control sequence.

   B. Contractor shall provide as built diagram of network bus routing listing all devices on bus, once wiring is complete prior to scope completion.

END OF SECTION 23 0900
SECTION 23 2113 – HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:

1. Hot-water heating piping.
2. Air-vent piping.

1.2 RELATED DOCUMENTS

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

B. Section 23 0500 “Basic Mechanical Materials and Methods” apply to the work of this Section as if fully repeated herein.

C. The following Sections contain requirements that relate to this Section:

1. Division 23 Section “Basic Mechanical Materials and Methods” for general piping materials and installation requirements, and for labeling and identifying hydronic piping.
2. Division 23 Section “Hangers and Supports” for pipe supports, product descriptions, and installation requirements. Hanger and support spacing is specified in this Section.
3. Division 23 Section “Controls Systems” for temperature-control valves and sensors.

1.3 DEFINITIONS

A. The following definitions apply to the work of this Section. Refer to Division 23 Section “Basic Mechanical Materials and Methods” for additional definitions.

1. CWP: Cold working pressure (formerly WOG – Water, Oil, Gas working pressure).
2. DZR Brass: Brass alloy containing not more than 15% zinc by weight.
3. EPDM: Ethylene-propylene-diene terpolymer rubber.
4. PTFE: Polytetrafluoroethylene.
5. SWP: Steam working pressure.
6. Pipe sizes used in this Specification are Nominal Pipe Size (NPS).
7. Class 125: Minimum 125-psig (860-kPa) SWP and minimum 200-psig (1380-kPa) CWP ratings.
8. Class 150: Minimum 150-psig (1035-kPa) SWP and minimum 300-psig (2070-kPa) CWP ratings.
1.4 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:

1. Hot-Water Heating Piping: 150 psig (1030 kPa) at 200°F (93°C).

1.5 SUBMITTALS

A. Field quality-control test reports.

B. Operation and Maintenance Data: For air control devices to include in emergency, operation, and maintenance manuals.

C. Product Data: For each type of the following:
   1. Pressure-seal fittings.

1.6 QUALITY ASSURANCE


B. Comply with NFPA 70 – National Electrical Code. Do not route piping directly above electric panelboards and switchboards, or other prohibited locations.

1.7 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

B. Coordinate pipe fitting pressure classes with products specified in related Sections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Manual Air Vents:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett; a Xylem Brand.
2.2 PIPING MATERIALS
   A. General: Refer to Part 3 “Piping Applications” Article for applications of pipe and fitting materials, including a schedule of which types of piping to use in which application.

2.3 COPPER TUBE AND FITTINGS
   A. Drawn-Temper Copper Tubing: ASTM B88, Type K (ASTM B88M, Type B).
   B. Wrought-Copper Fittings and Unions: ASME B16.22.

2.4 SPECIALTIES
   A. Refer to Division 23 Section “Basic Mechanical Materials and Methods” for joining materials, transition fittings, and dielectric fittings. Those requirements apply to the work of this Section as if fully reproduced herein.

2.5 GENERAL-PURPOSE VALVES
   A. Refer to Division 23 Section “Controls Systems” for Automatic Temperature-Control Valves, Actuators, and Sensors, whose requirements apply to the work of this Section as if fully reproduced herein.

2.6 AIR CONTROL DEVICES
   A. Manual Air Vents: Bronze body, nonferrous internal parts, operated via manual screwdriver or thumbscrew. NPS ½ (DN 15) inlet connection and NPS 1/8 (DN 6) discharge connection. CWP rating shall be 150 psig (1035 kPa) and rated operating temperature shall be 225°F (107 C).

PART 3 - EXECUTION

3.1 PIPING SCHEDULE OF APPLICATIONS
   A. Hot-water heating piping, aboveground, NPS 2 (DN 50) and smaller, shall be Type K (C), drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
   B. Air-Vent Piping: Same materials and joining methods as for piping specified for the service in which air vent is installed.
3.2 VALVE APPLICATIONS

A. Install manual air vents at all high points, in branch lines and elsewhere as required.

3.3 PIPING INSTALLATIONS

A. General: General piping installation is specified in Division 23 Section “Basic Mechanical Materials and Methods,” whose requirements apply to the work of this Section as if fully repeated herein.

B. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

C. Install unions in piping NPS 2 (DN 50) and smaller, at final connections of equipment and elsewhere as indicated.

D. Hang, support, and anchor all piping as specified in Division 23 Section “Hangers and Supports.”

3.4 PIPE JOINT CONSTRUCTION

A. Refer to Division 23 Section “Basic Mechanical Materials and Methods” for joint construction requirements for soldered joints in copper tubing.

3.5 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

3.6 TERMINAL EQUIPMENT CONNECTIONS

A. Install control valves in accessible locations close to connected equipment, but outside the service area. For example, control valve shall be as close to hydronic coil as practical, but not within the coil pull space and/or access door swing. Do not install where they will obstruct or access panels in ductwork.

3.7 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Notify Owners Representative 24 hours before required testing. All tests shall be conducted in the presence of the Owners Representative.
2. Leave joints uninsulated and exposed for examination during test.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve.
B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used. Do not pressure test with air.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system’s working pressure. Test pressure shall be minimum 100 PSIG. Test pressure shall be held for 1 hour.
5. Examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

END OF SECTION 23 2113
SECTION 26 0500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. This Section specifies the basic requirements for electrical installations and includes requirements common to all sections of Division 26. It expands and supplements the requirements specified in sections of Division 00.

B. Drawings and general provisions of the Contract, including general and supplementary conditions and specification sections Divisions 00 through 01, apply to this Section.

C. Codes and Standards: All equipment, material and installations shall comply with applicable codes, standards, and installation practices. Comply with the requirements of the applicable local building codes, the applicable NEC, all local rules and regulations including those of the fire authorities. Comply with all applicable NFPA standards. All material and equipment shall be listed by the Underwriters Laboratories (UL) standard that is applicable for the specific purpose of the material and equipment. The National Electrical Code, National Electrical Manufacturer’s Association (NEMA) Standards, and applicable ANSI and IEEE standards shall apply to the pertinent materials, equipment, and installation practices. Testing shall be in accordance with the applicable International Electrical Testing Association (NETA) standards.

1.2 SUMMARY OF WORK

A. The word “furnish” means supply for use, the word “install” means install in its proper location and connect up complete and ready for operation, and the word “provide” means to furnish and install.

B. Provide all new materials as indicated on the drawings and specifications and all items required to make the electrical system complete and in working order.

C. System descriptions included in scope of work are as follows:
   1. Power for temperature control system.

D. Work not included:
   1. Temperature control wiring for HVAC equipment (unless otherwise indicated) shall be by other Divisions.

1.3 WORK SEQUENCE

A. All work that produces excessive noise or interference with normal building operations shall be coordinated and scheduled with the Owner. Such work may require scheduling of work after occupied hours or weekends. The Owner reserves the right to determine when such work is conducted.
1.4 ELECTRICAL COORDINATION

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

1.5 QUALITY ASSURANCE

A. Responsibility Prior to Submitting Pricing or Bid Data:

1. Thoroughly review the contract documents and specifications and visit the site prior to issuing bid. Resolve all reported deficiencies with the Engineer prior to awarding any subcontracts, ordering material, or starting any work.

B. Qualifications:

1. Only products of specified manufacturers, or approved equals as determined by the Engineer, are acceptable.
2. Employ only workmen who are skilled in their trades.

C. Compliance with Codes, Laws, and Ordinances:

1. Conform to all requirements of the state, city and local codes, laws and ordinances and other regulations having jurisdiction over this installation.
2. If there are any discrepancies between the codes and regulations and these specifications, the Engineer shall determine the method or equipment to be used.
3. Inform the Engineer in writing, requesting a clarification at the time of the bidding, if any parts of the drawings or specifications are found not to comply with the codes or regulations.
4. Inform the Engineer in writing requesting a clarification if there is any discrepancy between a manufacturer’s recommendation and these specifications.

D. Examination of Drawings:

1. The drawings for the indicated work are diagrammatic, intended to convey the scope of the electrical work and to indicate the general arrangements and locations of equipment, wiring devices, etc., and the approximate sizes of equipment. Field verification of dimensions on plans is required. The actual conditions, including heights, lengths and orientation shall be the basis of the work.
2. The drawings and specifications shall be considered as mutually explanatory and complementary. Any electrical work called for by one and not by the other shall be performed as though required by all. All sections and subsections of the Electrical work shall be governed by and subject to the general and supplementary conditions. Report any discrepancies in or between the drawings and specifications, or between the drawings and actual field conditions to the Engineer in sufficient time to issue an addendum for clarification.
3. Determine the exact locations for equipment and rough-ins, and the exact routing of raceways.
4. Do not scale drawings to determine equipment and system locations.
5. Not all required components are shown on the documents, including junction boxes, pull boxes, conduit fittings, etc. Provide all components required for proper installation of the work.

6. Any item either shown on the drawings or called for in the specifications shall be included in this contract.

7. Determine quantities and quality of material and equipment required from the documents. Provide the more expensive or higher quality amount where discrepancies arise among drawings, schedules or specifications.

E. Electronic Media and Files:

1. Electronic media files of the contract drawings in AutoCAD or PDF format and copies of the specifications in PDF format may be requested.

2. Complete and return a signed “Electronic File Transmittal” form provided by Ross & Baruzzini upon request for electronic media.

3. Obtain approval from the appropriate Design Professional for use of their part of the documents if the information requested includes information prepared by other than Ross & Baruzzini.

4. The electronic contract documents may be used for preparation of shop drawings and record drawings only. The information may not be used in whole or in part for any other project.

5. The drawings prepared by Ross & Baruzzini for bidding purposes may not be used directly for raceway layout drawings or coordination drawings.

6. The use of these documents does not allow relief from the responsibility for coordination of work with other trades and verification of space available for the installation.

7. The information is provided to expedite the project with no guarantee by Ross & Baruzzini as to the accuracy or correctness of the information provided. Ross & Baruzzini accepts no responsibility or liability for the use of the provided information.

1.6 SUBMITTAL REVIEW RESPONSIBILITIES

A. General: Submittals are not requested for all products covered in the specifications. Submit only the data requested under the submittals portion of each specification section or where indicated in a Submittal Log. Un-requested submittals will not be processed or reviewed and will be returned to the submitter. Refer to “Submittal Register” in Division 1 for all required submissions of each specification section. All required submissions of that specification section are to be submitted for review in one all-inclusive submission. Any deviation from specified items is considered a substitution.

1. Non-requirement of submittals, when so noted, is not to be construed as an allowance for substitutions and does not provide relief from full compliance with the contract documents.

2. Any deviation from specified items is considered a substitution. A formal request for substitution must be submitted per the University of Missouri General Conditions.

B. Definitions:

1. Product Data: Pre-printed manufacturer's data.

2. Shop Drawings: Drawings made specifically for the manufacture of a particular piece of equipment to be used on this project.
3. Operation and Maintenance Data: Information containing instructions on the proper operation, maintenance and repair of the equipment, complete with written text, diagrams, photos, exploded views and parts lists.

Record Documents: Information indicating the actual installed conditions of the project on Mylar, electronic media, photographs or typed paper. Photographs are not allowed as a substitute for correcting the construction documents; the photographs are for the Owner’s future reference. Submit type, quantities and on media specified where indicated to be submitted.

C. Where more than one model is shown on a manufacturer’s sheet, clearly indicate exactly which item and which data is relevant to the work.

D. Where the manufacturer lists multiple part numbers or options on a single data sheet, the part number and options to be used shall be clearly set apart from other part numbers shown on that sheet.

E. Ensure that all submittals have been reviewed for total completeness and accuracy as to the requirements of the specifications and drawings before being submitted to the Engineer for review. The Contractor’s approval stamp is required on all submittals before submittal to the Engineer. Approval will indicate the Contractor’s review of all material and a complete understanding of exactly what is to be furnished. Clearly mark all deviations from the contract documents on all submittals. The item shall be required to meet all drawing and specification requirements if deviations are not clearly marked.

1. The Engineer shall not be responsible for informing the submitter on items that have not been included and are necessary for a complete review of the required submittal information for a specification section.

2. The Engineer shall have the option of returning any submittal, unmarked, if all required documentation called for in the specifications has not been provided in the submittal.

3. The Engineer shall review each submittal no more than two times and return to the submitter with the appropriate disposition.

4. If the Engineer is required to review a submittal a second time, it will be limited to review of the changed information, which must clearly be highlighted by the submitter. The submittal will be returned to the submitter with the appropriate disposition.

5. If the submittal is required to be reviewed a third time, it shall be done at the expense of the submitter. Charges for this additional submittal review will be calculated based on the Engineer’s standard hourly rates, as defined in their contract with the Owner.

F. Operation and Maintenance Manuals: All items required for insertion into each Operation and Maintenance (O&M) Manual are called out in the submittals portion of each specification section or in a Submittal Log. Ensure that the O&M submittal has been reviewed and includes all the requirements of the specifications. Submit only the data requested under the submittals portion of each specification section. FAX or photo copies are not allowed as submittals for operating and maintenance manuals. O&M submittals shall consist of searchable PDFs, where PDFs are provided. The Engineer will review the submittal for the Operation and Maintenance Manual one time and return to the submitter with the appropriate disposition.

G. Refer to each individual Division 23 Section for additional submittal requirements.
1.7 PRODUCT OPTIONS AND MATERIAL SUBSTITUTIONS

A. Where two or more materials are listed in the “Part 2 – Products” subsection of any Division 26 section, do not assume that the selection of materials is an option. Refer to “Part 3 – Execution” subsection of that same specification section for an explanation of which specific material(s) shall be used for which specific application(s). For example, Part 2 may list several types and grades of conductors, and Part 3 will describe which type and grade of conductors to use for a given application.

B. When two or more items of same material or equipment are required they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, wire, conduit, fittings, sheet metal, solder, fasteners, and similar items used in Work except as otherwise indicated.

C. Provide products which are compatible within systems and other connected items.

D. Substitutions: Products other than those specified must be submitted, approved and secured in writing from the Engineer per the University of Missouri General Conditions.

E. Where several manufacturers’ names are given, the manufacturer for which a catalog number is given is the basis of design and establishes the quality required.

F. Voluntary add or deduct prices for alternate materials may be listed on the bid form. These items will not be used in determining the low bidder. Assume all costs incurred as a result of using the offered material or equipment on his part or on the part of other Divisions whose work is affected.

1.8 PRODUCT, DELIVERY, STORAGE, HANDLING AND MAINTENANCE

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage and handling. Protect stored equipment and materials from damage.

B. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations. Review the site prior to bid for path locations and any required building modifications to allow movement of equipment. Approximate site access will be provided on the drawings.

C. Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage.

D. Keep all materials clean, dry and free from damaging environments.

1.9 MISCELLANEOUS MATERIALS

A. Miscellaneous Materials Include:
1. Miscellaneous metals for support of electrical materials and equipment.
2. Wood grounds, nailers, blocking, fasteners and anchorage for support of electrical materials and equipment.
3. Sealers for sealing around electrical materials and equipment; and for sealing penetrations in floors and walls.

1.10 WARRANTIES

A. Refer to the Division 01 “Closeout Procedures” for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.

B. Compile and assemble the warranties specified in Divisions 26 into a separated set of vinyl covered, three-ring binders, tabulated and indexed for easy reference.

C. Provide complete warranty information for each item to include product or equipment, date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, telephone numbers and procedures for filing a claim and obtaining warranty services.

D. Warranty requires correction of all work found to be defective or nonconforming to the Contract Documents, without cost to the Owner. Bear all costs associated with corrective measures and damage due to defects or nonconformance with the Contract Documents, excluding repairs required as a result of improper maintenance or operation, or normal wear and tear as determined by the Engineer.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section “Penetration Firestopping.”
2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements. Provide products by one of the following
   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. GPT Link-Seal
   d. Metraflex Co.
   e. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.
5. Place head end of bolts on accessible side of wall to allow for future adjustments.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounted items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right-of-Way: Give to piping systems installed at a required slope.

F. Jobsite Safety: The Contractor is the sole entity responsible for jobsite safety.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and
application of sealants and access panels. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 ELECTRICAL INSTALLATIONS

A. Coordinate electrical equipment and materials installation with other building components.

B. Verify all dimensions by field measurements.

C. Arrange for chases, slots, and openings in other building components to allow for electrical installations.

D. Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

E. Install systems, materials and equipment to conform to project requirements and approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.

F. Systems, materials and equipment which will be exposed in finished areas shall be installed level and plumb, parallel and perpendicular to other building systems and components.

G. Install electrical services and overhead equipment to provide the maximum headroom possible where mounting heights are not detailed or dimensioned.

H. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. Maintain code clearances in front of and about all electrical equipment. As much as practical, connect equipment for ease of disconnecting with minimum of interference with other installations.

I. Coordinate the installation of electrical materials and equipment above ceilings with suspension system, mechanical equipment and systems and structural components.

J. Include in the Work all labor, materials, equipment, services, apparatus and drawings (in addition to the Contract Documents) as required to complete the intended Work.

K. Control and interlock wiring shall be installed in a separate raceway and shall not be installed in the same raceway as power conductors.

L. Only new, clean and perfect equipment, apparatus, materials and supplies of latest design and manufacture shall be incorporated in the Work in order to assure an electrical system of high quality.

M. Determine electrical utility elevations prior to installation and coordinate with other trades. Installation priorities at a minimum shall be as follows:

1. Luminaires.
2. Gravity flow piping, including steam and condensate.
3. Electrical bus duct.
4. Sheet metal.
5. Cable trays, including access space.
6. Other piping.
7. Conduits and wireway.

3.4 CONNECTIONS TO EQUIPMENT

A. In many instances the drawings show an outlet box and power supply for specific equipment, be it Owner- or Contractor-furnished. It is to be understood, unless otherwise noted, that the Work includes a connection from the box to the equipment. Verify circuit conductor quantities and sizes and overcurrent device number of poles and rating as well as any special grounding requirements, for all Owner-furnished equipment and adjust the required work accordingly.

3.5 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 01 Section "Execution." In addition to the requirements specified in Division 01, the following requirements apply:

1. Perform cutting, fitting and patching of electrical equipment and materials required to:
   a. Uncover Work to provide for installation of ill-timed Work.
   b. Remove and replace defective Work.
   c. Remove and replace Work not conforming to requirements of the Contract Documents.
   d. Remove samples of installed Work as specified for testing.
   e. Install equipment and materials in existing structures.
   f. Cut, remove, and legally dispose of selected electrical equipment, components, and materials as indicated, including but not limited to, removal of electrical items indicated to be removed and items made obsolete by the new Work.

2. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.
   a. Protect the structure, furnishings, finishes and adjacent materials not indicated or scheduled to be removed.
   b. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

3.6 APPLICATION OF SEALERS

A. General: Comply with sealer manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

3.7 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Contractor shall X-ray concrete slabs and walls prior to core drilling to avoid damage to utilities or reinforced steel.

D. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry

   1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.8 SLEEVE-SEAL INSTALLATION

A. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve.
B. Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations. Provide insulated bushings at each end of sleeve. For sleeves through fire rated-wall or floor construction, apply UL-listed firestopping sealant in gaps between sleeves and enclosed conduits and cables.

3.9 FIRESTOPPING

A. Apply rated firestopping sealants at all penetrations of fire and smoke walls; at all penetrations of floors and at other locations as noted on the drawings or where required by Code. Consider walls that are common to different abutting buildings, to different additions to buildings, and to fire and smoke separations within buildings as requiring firestopping sealant. Refer to architectural drawings. For existing buildings where fire separations are not noted on any drawings, use reasonable logic as to which separations are fire-rated. When in doubt, consult with Engineer or Architect.

B. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.10 ADJUST AND CLEAN

A. Thoroughly clean all equipment and systems prior to the Owner’s final acceptance of the project.

B. Clean all foreign paint, grease, oil, dirt, labels, stickers, etc., from all equipment.

C. Remove all rubbish, debris, etc., accumulated during construction from the premises.

D. Refer to the Division 01 Section "Closeout Procedures" for general requirements for final cleaning.

3.11 SPECIAL REQUIREMENTS

A. Coordinate the installation of all equipment, controls, devices, etc., with other trades to maintain clear access area for servicing.

B. Install all equipment to maximize access to parts needing service or maintenance. Review the final location, placement and orientation of equipment with the Owner’s representative prior to setting equipment.

C. Include removal and reinstallation of equipment and devices if they were installed without regard to coordination of access requirements and without previous confirmation with the Owner’s representative.

3.12 FIELD QUALITY CONTROL

A. General:
1. All required equipment and systems tests shall be made during and prior to substantial completion as required.
2. All required testing instruments, meters, etc., shall be provided.
3. Technicians operating testing equipment shall be trained in testing procedures.
4. Testing shall confirm that equipment and systems provided by the Contractor have been installed properly.
5. Unsatisfactory test results shall result in revisions or replacement of equipment or settings as required to provide a system capable of meeting test requirements. Tests shall be repeated or additional tests made as necessary to confirm system capability as required by the Owner, Engineer or Authority Having Jurisdiction.

3.13 OPERATION AND MAINTENANCE MANUALS

A. Refer to the Division 01 Section: “Closeout Procedures” for procedures and requirements for preparation and submittal of maintenance manuals.

B. In addition to the information required by Division 01 for Maintenance Data, include the following information:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions, regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.
3. Maintenance procedures for routine preventive maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.

C. Submit one (1) properly indexed and bound copies in “D” ring style notebooks, of the Operations and Maintenance Instructions to the Architect or Engineer. Make all corrections or additions required.

1. Provide the same documentation in the same order and organization within a combined, searchable PDF.

D. Operation and Maintenance Instructions shall be a searchable pdf and include the following:

1. Notebooks shall be heavy duty locking three-ring binders, black in color, and incorporate clear vinyl sheet sleeves on the front cover and spine for slip-in labeling. “Peel and stick” labels are not acceptable. Sheet lifters shall be supplied at the front of each notebook. Size notebooks a minimum of 1/2 inch thicker than the material for future inserts. Label the spine and front cover of each notebook. If more than one notebook is required, label in consecutive order. For example; 1 of 2, 2 of 2. No other forms of binding will be acceptable.
2. Prepare binder covers (front and spine) with printed title “Operation and Maintenance Instructions,” title of project, and subject matter of binder when multiple binders are required.
3. Title page with project title, Architect, Engineer, Contractor, and Subcontractor with addresses, telephone numbers, and contacts.
4. Table of Contents describing all index tabs.
5. Listing of all Subcontractors and major equipment suppliers with addresses, telephone numbers and contacts.
6. Index tabs dividing information by specification section, major equipment, or systems. All tab titles shall be clearly printed under reinforced plastic tabs. Label all equipment to match the identification in the construction documents.
8. Copies of all final approved shop drawings and submittals.
9. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
10. Dimensional drawings of equipment.
11. Detailed parts lists, each with a list of suppliers.
12. Operating procedures for each system.
13. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
14. Replacement parts and service material requirements for each system and the frequency of service required.
15. Instruction books, cards, and manuals furnished with the equipment.

E. Operation and maintenance data shall consist of written instructions for the care, maintenance, and operation of the equipment and systems. Instruction books, cards, manuals furnished with the equipment shall be included.

F. Adequately instruct the Owner’s designated representative in the maintenance, care, and operation of the complete systems installed under this contract.

G. Provide verbal and written instructions to the Owner’s representatives by factory personnel in the care, maintenance and operation of the equipment and systems.

H. The instructions shall include:

1. Maintenance of equipment.

I. Notify the Engineer of the time and place for the verbal instructions to the Owner’s representative so his representative can be present if desired.

J. Minimum hours of instruction time for each item and/or system shall be as indicated in each individual specification section.

K. Operating Instructions:

1. Include instructions to the Owner’s representatives for the electrical and specialized systems, using factory-authorized technical representatives.

3.14 RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 01 Section "Closeout Procedures." In addition to the requirements specified in Division 01, indicate installed conditions for:
1. Corrections to equipment schedules, sequences of operations, and details.
2. Raceways of 2-inches and larger, indicating size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
3. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
4. Location of every home run point, such as receptacle, lighting fixture, or switch.
5. Approved substitutions, Contract modifications, and actual equipment and materials installed.
6. Mark Drawings to indicate revisions to conduit size and location both exterior and interior; actual equipment locations, dimensioned from column lines; concealed equipment, dimensioned to column lines; distribution and branch electrical circuitry; fuse and circuit breaker size and arrangements; support and hanger details; change orders; concealed control system devices.
7. Mark Specifications to indicate approved substitutions, change orders, actual equipment and materials used.

B. Maintain at the job site a separate and complete set of electrical drawings and specifications with all changes made to the systems clearly and permanently marked in complete detail.

C. Mark Drawings to indicate revisions to conduit size and location both exterior and interior; actual equipment locations, dimensioned from column lines; concealed equipment, dimensioned to column lines; distribution and branch electrical circuitry; fuse and circuit breaker size and arrangements; support and hanger details; Change Orders; concealed control system devices.

D. Mark drawings and specifications to indicate approved substitutions; Change Orders, and actual equipment and materials used. Mark all Change Orders, RFI responses, clarifications, and other supplemental instructions on the documents. Record documents that merely reference the existence of the above items are not acceptable. Reimburse the Engineer for all costs for the Engineer to develop record documents which comply with this requirement if unable to comply with said above requirements. Reimbursement shall be made at the Architect or Engineer’s hourly rates in effect at the time of the work.

E. Record changes daily and keep the marked drawings available for the Architect or Engineer’s examination at any normal work time.

F. Upon completing the job, and before final payment is made, give the marked-up drawings to the Engineer.
3.15 PROJECT CLOSEOUT

A. The following paragraphs supplement the requirements of Division 01:

B. Final Jobsite Observation:

1. Certify that the project jobsite is ready for the final jobsite observation.
2. Notify the Engineer a minimum of two working days prior to installation of ceiling tiles or lay-in ceilings to allow the Engineer to visit the project site.

END OF SECTION 26 0500
SECTION 26 0519 - CONDUCTORS AND 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. This Section includes the following:
      1. Conductors and Cables.

1.3 SUBMITTALS
   A. Submittals for approval by the Engineer are not required for this section. Unrequested submittals
      will not be processed or reviewed. Non-requirement of submittals is not to be construed as an
      allowance for substitutions and does not allow relief from full compliance with the contract
      documents.

1.4 QUALITY ASSURANCE
   A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70,
      Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for
      intended use.
   B. Comply with NFPA 70 “National Electrical Code.”
      1. Conform to applicable codes and regulations regarding toxicity of combustion products of
         insulating materials.
   C. UL Compliance: Provide components which are listed and labeled by Underwriters Laboratories
      under the following standards.
      1. UL Std. 83 Thermoplastic-Insulated Wires and Cables.
      2. UL Std. 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.
   D. NEMA and ICEA Compliance: Provide components which comply with the following standards:
      1. WC-70: Power Cables Rated 2,000V or Less for the Distribution of Electrical Energy.
   E. IEEE Compliance: Provide components which comply with the following standard.
      1. Std. 82: Test procedures for Impulse Voltage Tests on Insulated Conductors.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. General Cable Corporation.
5. Cerro Wire.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

D. Multiconductor Cable: Not allowed.

2.2 CONDUCTORS AND CABLES

A. General: Provide wire and cable suitable for the temperature, conditions and location where installed.

B. Feeders: Copper 600 volt insulation. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Branch Circuits: Copper, 600 volt insulation. Solid for No. 14 AWG and smaller; stranded for No. 12 AWG and larger.

D. Control Circuits: Copper, stranded conductor, 600 volt insulation.

E. Single Conductors for Feeders and Branch Circuits:

1. Stranding: Provide solid conductors for branch circuits and non-vibrating power utilization equipment utilizing Number 14 AWG and smaller. Provide stranded conductors for Number 12 AWG and larger. Provide stranded conductors, regardless of size, for connections to vibrating equipment such as motors and transformers.

2.3 REMOTE CONTROL AND SIGNAL CABLE

A. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 60 degrees C, individual conductors twisted together, shielded, and covered with a PVC jacket.
B. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degrees C, individual conductors twisted together, shielded, and covered with a PVC jacket; UL listed.

C. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degrees C, individual conductors twisted together, shielded and covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums.

2.4 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type and class for application and service required.

PART 3 - EXECUTION

3.1 CONDUCTOR INSULATION, APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Concealed in Ceilings, Walls, Partitions, Raised Flooring and Crawlspace: Type THHN-THWN, single conductors in raceway.

C. Exposed, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.

D. Class 1 Control Circuits: Install per NEC Article 725.

E. Class 2 Control Circuits: Install per NEC Article 725.

3.2 DEVIATION FROM CONTRACT DRAWINGS

A. Basis of Design is copper conductors installed in raceway, based on 30 degrees C ambient temperature (NEC Table 310.15(B)(16)). If materials or methods selected for installation differ from the basis of design, size conductors and conduits to meet or exceed the ampacity of circuits selected for the basis of design.

B. Routing multiple conductors within a single conduit requires the conductor ampacity to be derated per National Electrical Code Article 310. Do not provide more than 4 conductors within a single conduit.
conduit to serve loads such as panelboards, motor control centers, motors over 1/4 horsepower, etc.

C. Where ungrounded conductors are increased in size for any reason, equipment grounding conductors shall be increased in size proportionally according to the circular mil area of the ungrounded conductors.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Install products in accordance with manufacturer's instructions.

B. Conceal cables in finished walls, ceilings and floors unless otherwise indicated.

C. Completely and thoroughly swab raceway before installing wire.

D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

E. Use pulling means including fish tape, cable, rope, and basket weave wire and cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable. Do not exceed maximum tensile strength of conductor or grip. Do not exceed maximum sidewall pressure limitations of cables.

F. Pull conductors simultaneously where more than one is being installed in the same raceway.

G. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

H. Feeder conductors shall be continuous and shall not contain splices.

I. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than Number 10 AWG cabled in individual circuits. Make terminations so there is no more than 1/8 inch of exposed bare conductor at the terminal. Observe NEC 310.15 (B)(2)(a) adjustment factors.

J. Verify that interior of building has been protected from weather and mechanical work likely to damage wire and cable has been completed prior to installing wire and cable.

K. Use conductor not smaller than Number 12 AWG for power and lighting circuits.

L. Single conductors used for control circuits shall not be smaller than Number 14 AWG.

M. Use Number 10 AWG conductors (phase, neutral and ground) for 20 ampere, 120 volt branch circuits longer than 75 feet, unless drawings requirements are more stringent.

N. Use Number 10 AWG conductors (phase, neutral and ground) for 20 ampere, 277 volt branch circuits longer than 200 feet, unless drawings requirements are more stringent.
O. Place an equal number of conductors for each phase, neutral and ground of a circuit within the same raceway or cable when routing parallel conductors. Conductor lengths must be equal.

P. Support cables according to Division 26 Section "Hangers and Supports."

Q. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS AND TERMINATIONS

A. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

B. Clean conductor surfaces before installing lugs and connectors.

C. Utilize solderless compression terminals applied with circumferential compression for conductor sizes 8 AWG and larger and crimp in accordance with manufacturer instructions. Indenter compression method may be used for conductor sizes 10 AWG and smaller.

D. Phase Sequence: Connections to phase conductors at electrical equipment shall be made such that the A-B-C conductors, when facing the equipment, are oriented top to bottom, or left to right.

E. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 SPLICES AND TAPS

A. Conductor splices shall be kept to a minimum.

B. Only splice within accessible junction boxes or enclosures.

C. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors. Splices and taps shall be capable of carrying the full ampacity of the conductors without perceptible temperature rise.

D. Above Grade:

1. Use copper compression connectors applied with circumferential compression for conductor sizes 6 AWG and larger.

2. Use pre-molded insulated tap connectors for copper conductor splices and taps, Number 8 AWG and smaller. Insulate with UL listed insulating cover supplied by same manufacturer as connector.

3. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, Number 10 AWG and smaller.

4. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor, or three layers of tape, whichever is greater.
3.6 FIELD QUALITY CONTROL

A. Inspect wire for physical damage and proper connection.

B. Measure tightness of bolted connections with properly scaled and calibrated torque tool and compare torque measurements with manufacturer’s recommended values.

C. Before energizing, test wires and cables for electrical continuity and for short circuits.

D. Remove and replace malfunctioning conductors and retest as specified above.

END OF SECTION 26 0519
SECTION 26 0526 - GROUNDING AND BONDING

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 solid grounding of electrical systems and equipment. It includes basic requirements for grounding for protection of life, equipment, circuits and systems. Grounding requirements specified in this Section may be supplemented in other sections of these Specifications.

1.3 SUBMITTALS
A. Submittals for approval by the Engineer of products to be used are not required for this section. Unrequested submittals will not be processed or reviewed. Non-requirement of submittals is not to be construed as an allowance for substitutions and does not allow relief from full compliance with the contract documents.

1.4 QUALITY ASSURANCE
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. Comply with UL 467 for grounding and bonding materials and equipment.
C. Listing and Labeling: Provide products specified in this Section that are listed and labeled for the specific purposes by Underwriters Laboratories.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS
A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.
2.2 CONDUCTORS

A. General: Comply with Division 26 Section "Conductors and Cables" for insulated grounding conductors. Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.

B. Equipment Grounding Conductor: Green insulated; conductor metal shall match branch circuit conductor metal.

C. Grounding Electrode Conductor: Stranded cable.

D. Copper Conductors: Conform to the following:
   1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
   2. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
   3. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
   4. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.3 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure (clamp) type with at least two bolts.

C. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Pressure Connectors: High-conductivity-plated units.

E. Bolted Clamps: Heavy-duty units listed for the application.

F. Compression Connectors: Irreversible compression connectors must be factory filled with oxide inhibitor and fully crimped with a 14-ton or larger hydraulic tool so that index number is embossed on the connector. May be used above or below grade.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
B. Seal all exterior wall penetrations air-tight.

3.2 EQUIPMENT GROUNDING

A. Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

B. Install separate insulated equipment grounding conductors with all feeders and branch circuit conductors. Terminate each end on a grounding lug or bus.

3.3 BONDING

A. Separately Derived Systems: Where the NEC requires separately derived systems to be grounded, provide grounding in accordance with the NEC.

3.4 CONNECTIONS

A. General: Select connectors, hardware and conductors and make connections in such a manner as to minimize possibility of galvanic action or electrolysis.

1. Make connections with clean bare metal at points of contact.
2. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
3. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
4. Coat and seal connections involving dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

C. Equipment Grounding Conductors: Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs.

D. Metallic Raceway Continuity: Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

E. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A.

F. Compression-Type Connections: Use hydraulic compression tools of at least 14-ton size to provide the correct circumferential pressure for compression connectors. Use tools and dies...
recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

END OF SECTION 26 0526
SECTION 26 0529 - HANGERS AND SUPPORTS

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. Secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals and associated fastenings.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. IMC: Intermediate metal conduit.
C. RMC: Rigid metal conduit.
D. RNC: Rigid non-metallic conduit.
E. 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 four times the applied force.

1.4 SUBMITTALS

A. Submittals for approval by the Engineer are not required for this section. Unrequested submittals will not be processed or reviewed. Non-requirement of submittals is not to be construed as an allowance for substitutions and does not allow relief from full compliance with the contract documents.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 70.
B. Electrical components shall be listed and labeled for the specific intended purpose by Underwriters Laboratories, Inc.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Slotted Metal Angle and U-Channel Systems:
   a. Allied Tube & Conduit.
   c. B-Line Systems, Inc.
   d. GS Metals Corp.
   e. Unistrut Diversified Products.

2. Conduit Sealing Bushings:
   a. Bridgeport Fittings, Inc.
   c. O-Z/Gedney.
   d. Raco, Inc.
   e. Red Seal Electric Corp.

2.2 COATINGS

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish or inherent material characteristic.

2.3 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets and spring steel clamps.

B. Fasteners: Types, materials and construction features as follows:

1. Expansion Anchors: Carbon steel wedge or sleeve type.
2. Toggle Bolts: All steel springhead type.

C. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps and cap screws.

D. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.

B. Coordinate with the building structural system and with other disciplines’ installations.

C. Raceway Supports: Comply with the NEC and the following requirements:
   1. Conform to manufacturer's recommendations for selection and installation of supports.
   2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 pounds safety allowance in the strength of each support.
   3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
   4. Support parallel runs of horizontal raceways together on trapeze-type hangers.
   5. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-inch and smaller raceways serving branch circuits, telephone and data above suspended ceilings only. For hanger rods with spring steel fasteners, use 1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.
   6. Space supports for raceways in accordance with Table I of this section. Space supports for raceway types not covered by the above in accordance with NEC.
   7. Support exposed and concealed raceway within 3 feet of boxes, access fittings, device boxes or cabinets.
   8. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway or conductor terminals.
   10. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers and other devices.

D. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, motor control centers, disconnect switches and control components in accordance with the following:
   1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4-inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.

3. Do not fasten supports to ceiling systems, piping, ductwork, mechanical equipment or conduit unless otherwise noted.

4. Do not use powder-actuated anchors without specific permission.

5. Do not drill structural steel members.

6. Install surface-mounted cabinets and panelboards with minimum of four anchors.

7. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

E. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.2 PAINTING

A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.
# TABLE I: SPACING FOR RACEWAY SUPPORTS

<table>
<thead>
<tr>
<th>Raceway Size (Inches)</th>
<th>No. of Conduits in Run</th>
<th>Location</th>
<th>Maximum Spacing of Supports (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>RMC &amp; IMC*</td>
</tr>
<tr>
<td><strong>HORIZONTAL RUNS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2, 3/4</td>
<td>1 or 2</td>
<td>Flat ceiling or wall.</td>
<td>5</td>
</tr>
<tr>
<td>1/2, 3/4</td>
<td>1 or 2</td>
<td>Where it is difficult to provide supports except at intervals fixed by the building construction.</td>
<td>7</td>
</tr>
<tr>
<td>1/2, 3/4, 1</td>
<td>3 or more</td>
<td>Any location.</td>
<td>7</td>
</tr>
<tr>
<td>1 &amp; larger</td>
<td>1 or 2</td>
<td>Flat ceiling or wall.</td>
<td>6</td>
</tr>
<tr>
<td>1 &amp; larger</td>
<td>1 or 2</td>
<td>Where it is difficult to provide supports except at intervals fixed by the building construction.</td>
<td>10</td>
</tr>
<tr>
<td>1 &amp; larger</td>
<td>3 or more</td>
<td>Any location.</td>
<td>10</td>
</tr>
<tr>
<td>Any</td>
<td>--</td>
<td>Concealed.</td>
<td>10</td>
</tr>
<tr>
<td><strong>VERTICAL RUNS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2, 3/4</td>
<td>--</td>
<td>Exposed.</td>
<td>7</td>
</tr>
<tr>
<td>1, 1-1/4</td>
<td>--</td>
<td>Exposed.</td>
<td>8</td>
</tr>
<tr>
<td>1-1/2 and larger</td>
<td>--</td>
<td>Exposed.</td>
<td>10</td>
</tr>
<tr>
<td>Up to 2</td>
<td>--</td>
<td>Shaftway.</td>
<td>14</td>
</tr>
<tr>
<td>2-1/2</td>
<td>--</td>
<td>Shaftway.</td>
<td>16</td>
</tr>
<tr>
<td>3 &amp; larger</td>
<td>--</td>
<td>Shaftway.</td>
<td>20</td>
</tr>
<tr>
<td>Any</td>
<td>--</td>
<td>Concealed.</td>
<td>10</td>
</tr>
</tbody>
</table>

*Maximum spacings for IMC above apply to straight runs only. Otherwise the maximums for EMT apply.

END OF SECTION 26 0529
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SECTION 26 0533 - RACEWAYS

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 raceways electrical wiring:

1. Metallic Conduit and Tubing.

1.3 SUBMITTALS

A. Submittals for approval by the Engineer are not required for this section. Unrequested submittals will not be processed or reviewed. Non-requirement of submittals is not to be construed as an allowance for substitutions and does not allow relief from full compliance with the contract documents.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70 "National Electrical Code" for components and installation.

C. Comply with NECA "Standard of Installation."

D. Listing and Labeling: Provide products specified in this Section that are listed and labeled by Underwriters Laboratories for the specific purpose and comply with the following standards:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
3. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
4. ANSI C80.6 – Intermediate Metal Conduit, Zinc Coated.
5. ANSI/NFPA 70 - National Electrical Code.
6. ANSI/NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable.
7. NECA "Standard of Installation."
PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by installer to fulfill wiring requirements, and comply with applicable portions of NFPA 70 for raceways.

B. Bushings: Bushings for terminating conduits smaller than 1-1/4 inches are to have flared bottom and ribbed sides, with smooth upper edges to prevent injury to cable insulation. Install insulated type bushings for terminating conduits 1-1/4 inches and larger. Upper edge to have phenolic insulating ring molded into bushing. Bushings to have screw type grounding terminal.

C. Raintight Sealing Hubs: Two piece type with outer internally-threaded hub to receive conduit, inner locking ring with bonding screw, insulated throat, and V-shaped ring or O-ring.

2.2 METAL CONDUIT AND TUBING

A. Rigid Steel (Metallic) Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. LTV Steel Tubular Products Company.
   c. O-Z Gedney.
   d. Wheatland Tube Company.

2. Description: Conduit to be seamless, hot dipped galvanized rigid steel. Threads to be cut and ends chamfered prior to galvanizing. Galvanizing to provide zinc coating fused to inside and outside walls of conduit. Provide an enamel lubricating coating on the inside of the conduit. Conduit to conform to ANSI C80.1 and listed and labeled under UL 6.

3. Fittings and Conduit Bodies: NEMA FB 1, single piece threaded, cadmium plated malleable iron.

4. Joint Compound: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

B. Electrical Metallic Tubing:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Republic Conduit.
   c. Wheatland Tube Company.
2. Description: Conduit to be seamless, hot dipped or electro-galvanized steel tubing. Galvanizing to provide zinc coating fused to outside walls of conduit. Provide an enamel lubricating coating on the inside of the conduit. Conduit to conform to ANSI C80.3 - 1983 and listed and labeled under UL 797.

3. Fittings and Conduit Bodies: Compression.

4. Expansion fittings for use with EMT shall allow for a minimum of four inches of movement and shall be similar to O-Z Gedney TX series, complete with bonding jumpers and hardware.

C. Flexible Metal Conduit: Zinc-coated steel

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AFC Cable Systems.
   b. Alflex Inc.
   c. Electri-Flex Co.

2. Description: Interlocked steel, consisting of spirally wrapped, convoluted hot dip galvanized steel strip. Zinc coating to cover both sides and all edges of steel strip. Convolutions to be interlocked to prevent separation when conduit is bent at radius equal to 4-1/2 times conduit O.D. Conduit to be listed and labeled under UL 1.


D. Liquidtight Flexible Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AFC Cable Systems.
   b. Alflex Inc.
   c. Electri-Flex Co.

2. Description: Flexible steel conduit with PVC jacket, listed and labeled under UL 360.

3. Fittings: and Conduit Bodies: Watertight, compression type, galvanized zinc coated cadmium plated malleable cast iron. Conduit to be listed and labeled under UL 360.

PART 3 - EXECUTION

3.1 METALLIC AND NON-METALLIC CONDUIT APPLICATION

A. The following schedule shall be followed for all installations, unless it creates a violation of applicable codes or is otherwise specifically dictated otherwise within the drawings.

1. Indoor Locations:
   a. Exposed, not subject to physical damage, or above 7 feet-0 inches of finished floor: RMC or EMT.
b. Exposed, subject to physical damage, or within 7 feet-0 inches of finished floor: RMC.
c. Finished spaces, concealed above suspended ceilings and interior walls and partitions: EMT.
d. Wet or Damp Locations: RMC.

2. Connections to vibrating equipment: FMC, except use LFMC in wet or damp locations.

B. Conduit Size:

1. Conduits shall be sized as shown on drawings. Where conduit sizes are not indicated, conduits shall be sized in accordance with the latest version of the National Electrical Code (NFPA 70) and shall be limited to a 40 percent conductor fill percentage. Conductor ampacities must be maintained; therefore adjustment factors for temperature and quantity derating values must be observed.

   a. Minimum Conduit Size: Unless otherwise noted, 3/4-inch (21-mm) trade size with the following exceptions:

      1) Switchlegs, Luminaire Whips and Control Wiring: 1/2-inch.

   b. Conduit sizes may change only at the entrance or exit of a junction box.

3.2 METALLIC CONDUIT INSTALLATION

A. General Installation Requirements

1. Conduits shall be mechanically and electrically continuous from source of current to all outlets unless a properly sizes grounding conductor is routed within the conduit. All metallic conduits shall be bonded per NFPA 70.

2. Do not reduce the indicated sizes of raceways. Conduit sizes may only change junction and pull boxes.

3. Complete raceway installation before starting conductor installation.

4. Use temporary closures to prevent foreign matter from entering raceway.

5. Avoid moisture traps; provide junction box with drain fitting at low points in raceway system.

6. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Empty raceways shall be labeled at each end indicating origin of the raceway. Labels shall be self-adhesive vinyl labels.

7. Raceways containing feeders and circuits associated with branches of the essential power system, the emergency power system, the legally required power system and the optional standby system must be kept entirely independent from each other and other sources of power.

B. Conduit Routing:

1. Conduit shall be concealed in walls and above ceilings within finished spaces and may be exposed within unfinished spaces (such as mechanical and utility areas) where conditions
dictate and as practical. Where routed exposed, headroom shall be maintained for pedestrian and vehicular traffic.

2. Raceway routing proposed on Drawings is diagrammatic in nature and shown in approximate locations unless dimensioned. Coordinate conduit routing with beams, joists, columns, windows, etc., as required to complete wiring system. Verify field measurements, routing and termination locations of raceway with obstructions and other trades prior to rough-in.

3. Conduit installation shall be coordinated with all other systems on the project. The Construction Team shall exchange details of their work in order to ensure adequate and coordinated fit of all systems within ceiling spaces and exposed unfinished areas.

4. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions, except as otherwise indicated.

5. Route exposed conduit and conduits above ceilings parallel and perpendicular to building structural lines, and as close to building structure as possible.

6. Raceways are not to cross pipe shafts or ventilating duct openings, nor are they to pass through HVAC ducts. Support riser raceway at each floor level with clamp hangers. Maintain adequate clearance between raceway and piping.

7. Coordinate layout and installation of conduit with other construction elements to ensure adequate headroom, working clearance and access.

8. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

9. Do not install aluminum conduits in contact with concrete.

C. Conduit Supports:

1. Install raceways level and square and at proper elevations. Provide adequate headroom. Group related conduits; support using conduit rack. Construct rack using steel channel. All conduit supports shall be secured to walls, structural members and bar joists. Do not support conduits from non-structural members, such as ductwork, water or fire suppression piping, or ceiling grid support system.

2. Run parallel or banked raceways together, on common support racks where practical and make bends from same center line to make bends parallel. Use factory elbows only where they can be installed parallel; otherwise, provide field bends for parallel raceways. Provide space within each rack for 20 percent additional conduits.

3. Support raceways as specified in Division 26 Section "Hangers and Supports."

D. Conduit Fittings and Terminations:

1. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

2. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

3. Install raceway sealing fittings according to the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank coverplate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings where conduits enter or leave hazardous locations, where conduits pass from warm locations to cold locations, such as the boundaries of
refrigerated spaces, such as kitchen cold boxes, air-conditioned spaces and other places indicated on the drawings or required by NFPA 70.

4. Expansion/Deflection Joints: Provide suitable fittings to accommodate expansion and contraction where raceway crosses seismic and expansion joints. Install expansion fittings in the full open position if installed during a period of lowest expected temperature, and in the fully closed position if installed during a period of highest expected temperature. Install at proportionate intermediate position for intermediate temperatures.

   a. In addition to the foregoing, provide expansion fittings according to the following table, for exposed linear runs or runs in hung ceilings where such runs do not contain junction boxes, pull boxes, nor bends totaling more than 30 degrees.
   b. EMT and RMC expansion couplers shall be UL listed with an internal copper braided bonding jumper that meets the requirements of NEC 250.98. Fitting shall be listed as suitable for wet locations and rain water tight when installed in wet or outdoor locations.

<table>
<thead>
<tr>
<th>Raceway Material</th>
<th>Indoor, conditioned areas</th>
<th>Outdoors and non-conditioned areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>One expansion fitting in runs longer than 80 feet, additional expansion fittings every 400 feet</td>
<td>One expansion fitting in runs longer than 40 feet, additional expansion fittings every 200 feet</td>
</tr>
</tbody>
</table>

5. Flexible Connections: Use maximum of 6 feet of flexible metal conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement and for all motors. Use Liquidtight flexible metal conduit in wet or damp locations. Install ground conductor across flexible connections.

6. Avoid use of dissimilar metals throughout system to eliminate possibility of electrolysis. Where dissimilar metals are in contact, coat surfaces with corrosion inhibiting compound before assembling.

E. Conduit Bends:

1. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
2. Make bends and offsets so the inside diameter is not reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
3. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender when field-fabricated elbows are required for bends in metal conduit larger than 2 inch size.

3.3 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."
3.4 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING

A. Upon completion of installation of system, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches and abrasions.

3.6 MARKING AND IDENTIFICATION

A. Mark and identify conduits in accordance with Section 26 0553 “Identification for Electrical Systems.”

3.7 RECORD DOCUMENTS

A. Accurately record actual routing of all feeder and sub-feeder conduits regardless of size and branch circuits conduits larger than 2-inches.

END OF SECTION 26 0533
SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Identification for raceways.
2. Identification for wires, cables and conductors.

1.3 SUBMITTALS

A. Submittals for approval by the Engineer are not required for this section. Unrequested submittals will not be processed or reviewed. Non-requirement of submittals is not to be construed as an allowance for substitutions and does not allow relief from full compliance with the contract documents.

1.4 QUALITY ASSURANCE

A. Comply with the following standards:

2. NFPA 70.
4. ANSI Z535.4 for safety signs and labels.

B. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

2. Ideal Industries, Inc.
3. 3M.
4. Panduit Corp.
5. Seton Name Plate Co.
6. Thomas & Betts.

2.2 ELECTRICAL IDENTIFICATION PRODUCTS

A. Self-Adhesive Vinyl Labels (Raceways and Boxes): Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

B. Self-Adhesive Vinyl Tape for Banding (Raceway, Wire and Cable): Colored, heavy duty, waterproof, fade resistant; 2 inches wide.

C. Self-Adhesive Tape Markers (Wire and Cable): Vinyl or vinyl-cloth, self-adhesive, wraparound, cable and conductor markers with preprinted numbers and letters.

D. Snap-Around, Color-Coding Bands (Raceways and Cables): Slit, pre-tensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Colored Adhesive Marking Tape (Raceways, Wires, and Cables): Self-adhesive plastic coated cloth tape similar to Brady 441XX or 442XX series.

F. Conductor Identification Products:

1. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
2. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
2.3 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with lettering and background colors as indicated. Labels shall be at least 2-1/4 inches high. Where space does not permit this label size, smaller stock and lettering is permitted.

2.4 CABLE TIES

A. Cable Ties: Fungus-inert, self-extinguishing, nylon one-piece, self-locking cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a minimum temperature range from minus 50 degrees F to 350 degrees F. Provide ties in specified colors when used for color-coding.

B. Identification Cable Ties: Same as "Cable Ties" above, except with integral tab of suitable size for marking requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Increase size of labels and letters to those appropriate for viewing from the floor for elevated components.

C. Lettering and Graphics: Coordinate names, abbreviations, colors and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering and colors as required by code.

D. Install identification devices in accordance with manufacturer's written instructions and requirements of NEC.

E. Clean and degrease surfaces prior to applying identification products. Apply identification to surfaces that require finish after finish work is completed. Utilize primer for metal surfaces, heavy-duty acrylic resin block filler for concrete masonry, and clear alkali-resistant alkyd binder-type sealer for concrete surfaces.

F. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

G. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
   1. In Spaces Handling Environmental Air: Plenum rated.

3.2 LABEL COLOR CODE LEGEND

A. Provide the following color coding scheme for each label based on the power system it is identifying:
   1. Normal Power: Black letters on white background.

3.3 RACEWAY IDENTIFICATION

A. Identify Raceways of Certain Systems with Color Banding: Band exposed and accessible raceways of the following systems for identification. Bands shall be pre-tensioned, snap-around colored plastic sleeves, colored adhesive marking tape, or a combination of the two. Make each color band 2 inches wide, completely encircling conduit and place adjacent bands of two-color markings in contact, side by side. Install bands at changes in direction, at penetrations of walls and floors and at 20-foot maximum intervals in straight runs. Apply the following colors:
   5. At contractor option, manufacturer painted EMT conduit (when EMT conduit is allowed or required to be used for the above systems), may be utilized in lieu of the banding noted above. Fittings would not have to be painted. All painting shall comply with Division 09 requirements.

B. Where conduits leave a switchboard, panelboard, motor control center, etc., identification shall be provided on each conduit indicating the load being served.

C. Contractor shall be responsible for providing the Owner with laminated, colored, typewritten legends indicating the identification color scheme. At a minimum, these legends should be installed in the main electrical room and branch electrical closets. Provide two additional legends to the Owner to use at their discretion.

D. Identification of Raceways with Labeling:
   1. Raceway Labeling: Provide labeling on conduits indicating electrical distribution system contained within (e.g. Normal, Life Safety, etc.) and operating voltage level. Label size shall be as follows:
2. Raceways carrying circuits over 600V: Provide label with 3-inch (75mm) high letters on 20-inch (500mm) centers to read as follows: "DANGER CONCEALED HIGH VOLTAGE WIRING."

3.4 BOX IDENTIFICATION

A. Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage:

1. Normal Power.

B. At each junction, pull and connection box, identify the following: with self-adhesive vinyl labels or permanent marker (color coded) neatly hand-printed. Identification of these boxes shall be located on the inside of cover if located in finished spaces:

1. Power and lighting circuits: Indicate system voltage and identify contained circuits and panelboard serving load (e.g., “120V, PP1-1, 3, 5”).
2. Other wiring: Indicate system type and wiring description (e.g., “FIRE ALARM NAC #2”).

C. Paint box covers to correspond with system types as follows:

1. Fire Alarm: Red.

3.5 CIRCUIT IDENTIFICATION

A. Label conductors as follows:

1. Multiple Power or Lighting Circuits in the Same Enclosure: Where multiple branch circuits are terminated or spliced in a box or enclosure, label each conductor with source and circuit number.
2. Multiple Control Wiring and Communication/Signal Circuits in Same Enclosure: For control and communications signal/wiring, use wire/cable marking tape at terminations in wiring boxes, troughs and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tape.
3.6 CONDUCTOR COLOR CODING

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, panelboards, manholes, handholes, switches, etc., use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below all conductors.
   a. Color shall be factory-applied, or field-applied for sizes larger than No. 8 AWG, if Authorities Having Jurisdiction permit
      1) Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
   b. Colors for 208/120V Circuits:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
      4) Neutral: White.
      5) Ground Bond: Green.

B. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control and signal connections.

1. Identify conductors, cables and terminals in enclosures and at junctions, terminals and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

C. Open Cable Identification

1. Low Voltage Cable (Less than 120V): Provide self-adhesive pre-printed vinyl tape markers at 20 foot intervals to identify all cables run exposed or located above the accessible ceilings. Indicate the associated system by using the following color coding schemes:
   a. Fire Alarm: Red lettering on white background.
   b. Temperature Controls: Blue lettering on white background.
3.7 RECEPTACLE AND SWITCH IDENTIFICATION

A. Identification Material: Engraved plastic-laminated labels, 1/16-inch minimum thickness with white letters on a red face for emergency receptacles. Stainless steel coverplates shall be directly engraved. Font height shall be 1/8-inch.

B. Coverplates: Provide engraved identification directly on all receptacle and switch coverplates indicating the source panelboard and circuit number serving the device (e.g., PP1#1).

3.8 ELECTRICAL EQUIPMENT IDENTIFICATION

A. On each unit of equipment, install unique designation label that is consistent with wiring diagrams, one-line diagram, schedules and the Operation and Maintenance Manual. Each section of a multiple-section equipment lineup shall be provided with its own identification label. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets and racks of each system. Systems include power, lighting, control, communication, signal, monitoring and alarm systems unless equipment is provided with its own identification.

B. Labeling Instructions:

1. Indoor Equipment: Provide self-adhesive, engraved, laminated acrylic or melamine label.
2. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
3. Nameplate Data: Provide permanent operational data nameplate on each item of power operated equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances and similar essential data. Locate nameplates in an accessible location.
4. Fusible Switches: Install fuse manufacturer-supplied labels inside the door of the fusible switch indicating the proper type and fuse required for replacement.

C. Specific Equipment Requirements:

1. Control Equipment: Including but not limited to disconnect switches, starters, variable-speed controllers, contactors, motor control centers, pushbutton stations, etc.
   a. Identification label shall include the following:
      1) Equipment type and tag designation shown on the contract documents of the actual equipment served in 1/2 inch high bold lettering.
      2) Location of equipment being served in 1/4 inch high bold lettering. If the equipment being served by the control equipment is located in the same room, identify location as “THIS ROOM.”
      3) Voltage and phase rating of equipment in 1/4 inch high bold lettering.
      4) The name of the upstream equipment and location/room number it is located in using 1/4 inch high bold lettering.
b. Example Identification Label:

AHU-6 Supply Fan ‘AHU-6S’
Located in Mechanical Room 001
480V 3-Phase, 3 Wire
Fed from Distribution Panel MHEQ; Room 200

END OF SECTION 26 0553